COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 134.

PROCEEDINGS

OF THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

Pennsylvania State Board of Agriculture,

HELD IN THE

BOARD OF TRADE ROOMS, HARRISBURG, PA.

JANUARY 24 and 25, 1905.

1905.

WM. STANLEY RAY,
STATE PRINTER OF PENNSYLVANIA,
1905.


VIRTUE
LIBERTY AND
INDEPENDENCE

SUMMARY OF CONTENTS.

MEMBERS

OF THE

PENNSYLVANIA STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1905.

Members Ex-Officio.

HON. SAMUEL W. PENNYPACKER, Governor.
MAJ. I. B. BROWN, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. G. W. ATHERTON, President of The State College.
HON. WM. P. SNYDER, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

Appointed by the Governor.

R. I. Young, Middletown, Dauphin County, ...Term expires 1905
Col. R. H. Thomas, Mechanicsburg, Cumberland County, ...Term expires 1906
Gen. James A. Beaver, Centre County, ...Term expires 1907

Appointed by the State Poultry Association.

Norris G. Temple, Pocopson, Pa., ...Term expires 1906

Elected by County Agricultural Societies.

			Term expires.
Adams,	A. I. Weidner,	Arendtsville,	1906
Allegheny,	J. S. Burns,	Imperial, R. F. D. No. 1,	1906
Armstrong,	S. S. Blyholder,	Neale,	1908
Beaver,	A. L. McKibben,	New Sheffield,	1908
Bedford,	S. S. Diehl,	Bedford,	1906
Berks,	H. G. McGowan,	Geiger's Mills,	1907
Blair,	F. Jaekel,	Hollidaysburg,	1907
Bradford,	E. E. Chubbuck,	Rome, R. F. D. No. 16,	1907
Bucks,	W. T. Davis,	Ivyland,	1906
Butler,	W. H. H. Riddle,	Butler,	1906
Cambria,	H. J. Krumenacher,	Nicktown,	1906
Cameron,	W. H. Howard,	Emporium,	1906
Carbon,			
Centre,	John A. Woodward,	Howard,	1906
Chester,	M. E. Conard,	Westgrove,	1906

			Term expires.
Clarion,	S. X. McClellan,	Knox,	1907
Clearfield,	J. W. Nelson,	Shawville,	1907
Clinton,	J. A. Herr,	Mill Hall, R. F. D.,	1908
Columbia,	H. V. White,	Bloomsburg,	1906
Crawford,	M. W. Oliver,	Conneautville,	1904
Cumberland,	Chas. Mullen,	Mt. Holly Springs,	1906
Dauphin,			1903
Delaware,	J. Milton Lutz,	Llanerch,	1904
Elk,	John M. Witman,	St. Mary's,	1908
Erie,	S. D. West,	Wattsburg,	1907
Fayette,			1903
Forest,	C. A. Randall,	Tionesta,	1907
Franklin,	C. B. Hege,	Marion,	1908
Fulton,	R. M. Kendall,	McConnellsburg,	1907
Greene,	N. M. Biddle,	Carmichaels,	1907
Huntingdon,	Geo. G. Hutchison,	Warrior's Mark,	1906
Indiana,	S. M. McHenry,	Indiana,	1907
Jefferson,	W. L. McCracken,	Brookville,	1907
Juniata,	Matthew Rodgers,	Mexico,	1906
Lackawanna,	Henry W. Northup,	Glenburn,	1906
Lancaster,	W. H. Brosius,	Drumore,	1907
Lawrence,	Sam'l McCreary,	Neshannock Falls,	1906
Lebanon,	H. C. Snavely,	Lebanon,	1907
Lehigh,	P. S. Fenstemaker,	Allentown,	1907
Luzerne,	J. H. Snyder,	Trucksville,	1907
Lycoming,	A. J. Kahler,	Hughesville,	1906
McKean,	S. B. Colcord,	Port Allegany,	1906
Mercer,	W. C. Black,	Mercer,	1908
Mifflin,	M. M. Naginey,	Milroy,	1907
Monroe,	R. F. Schwarz,	Analomink,	1908
Montgomery,	J. Sexton,	North Wales,	1908
Montour,			1904
Northampton,	W. F. Beck,	Nazareth,	1906
Northumberland,	J. A. Eschbach,	Milton,	1905
Perry,	A. T. Holman,	Nekoda,	1907
Philadelphia,	E. Lonsdale,	Wyndmoor,	1907
Pike,			
Potter,			
Schuylkill,	W. H. Stout,	Pinegrove,	1906
Snyder,	J. F. Boyer,	Freeburg,	1906
Somerset,	Jacob S. Miller,	Friedens,	1904
Sullivan,	J. K. Bird,	Millview,	1906
Susquehanna,	E. E. Tower,	Hop Bottom,	1907
Tioga,	F. E. Field,	Wellsboro,	1908
Union,	J. Newton Glover,	Vicksburg,	1908
Venango,	August Morck,	Oil City,	1904
Warren,	R. J. Weld,	Sugargrove,	1908
Washington,	D. S. Taylor,	Raccoon,	1908
Wayne,	Warren E. Perham,	Niagara,	1907
Westmoreland,	M. N. Clark,	Claridge,	1907
Wyoming,	D. A. Knuppenburg,	Lake Carey,	1907
York,	G. F. Barnes,	Rossville,	1908

OFFICERS.

PRESIDENT.

Hon. Samuel W. Pennypacker, Governor, ... Harrisburg.

VICE PRESIDENTS.

Geo. G. Hutchison, ... Warrior's Mark.
S. S. Blyholder, ... Neale.
Matthew Rodgers, ... Mexico.

EXECUTIVE COMMITTEE.

Hon. Samuel W. Pennypacker, ... Harrisburg.
A. I. Weidner, ... Arendtsville.
P. S. Fenstemaker, ... Allentown.
S. X. McClellan, ... Knox.
H. G. McGowan, ... Geiger's Mills.
N. G. Temple, ... Pocopson.
Dr. E. E. Tower, ... Hop Bottom.
D. A. Knuppenburg, ... Lake Carey.
J. Newton Glover, ... Vicksburg.
A. J. Kahler, ... Hughesville.
N. B. Critchfield, *Secretary*, ... Harrisburg.

ADVISORY COMMITTEE.

N. B. Critchfield, *Secretary*, ... Harrisburg.
S. X. McClellan, ... Knox.
D. A. Knuppenburg, ... Lake Carey.
J. A. Herr, ... Mill Hall.

CONSULTING SPECIALISTS.

Botanist,	Prof. W. A. Buckhout,	State College.
Pomologist,	Dr. J. H. Funk,	Boyertown.
Chemist,	Dr. William Frear,	State College.
Vet. Surgeon,	Dr. Leonard Pearson,	Philadelphia.
Sanitarian,	Dr. Edward Patrick,	West Chester.
Microscopists and Hygienists,	Prof. C. B. Cochran,	West Chester.
	Dr. Geo. G. Groff,	Lewisburg.
Entomologists,	Pro. D. J. Waller,	Indiana.
	Prof. Franklin Menges,	York.
Ornithologist,	Prof. H. A. Surface,	Harrisburg.
Meteorologists,	E. R. Demain,	Harrisburg.
	J. L. Heacock,	Quakertown.
Mineralogist,	Col. Henry C. Demming,	Harrisburg.
Apiarist,	Prof. Geo. C. Butz,	State College.
Geologists,	Col. H. C. Demming,	Harrisburg.
	W. H. Stout,	Pinegrove.

STANDING COMMITTEES.

LEGISLATION.

Hon. A. J. Kahler, Chairman, ... Hughesville.
Hon. Jason Sexton, ... North Wales.
N. G. Temple, ... Pocopson.
H. G. McGowan, ... Geiger's Mills.
M. N. Clark, ... Claridge.

CEREALS AND CEREAL CROPS.

J. A. Eschbach, Chairman, ... Milton.

ROADS AND ROAD LAWS.

P. S. Fenstemaker, Chairman, ... Allentown.

FRUIT AND FRUIT CULTURE.

John F. Boyer, Chairman, ... Mt. Pleasant Mills.

DAIRY AND DAIRY PRODUCTS.

R. J. Weld, Chairman, ... Sugargrove.

FERTILIZERS.

Howard G. McGowan, Chairman, ... Geiger's Mills.

WOOL AND TEXTILE FIBRES.

D. S. Taylor, Chairman, ... Raccoon.

LIVE STOCK.

D. A. Knuppenburg, Chairman, ... Lake Carey.

POULTRY.

Norris G. Temple, Chairman, ... Pocopson.

FORESTS AND FORESTRY.

Irvin C. Williams, Chairman, ... Harrisburg.

APIARY.

J. W. Nelson, Chairman, ... Shawville.

FLORICULTURE.

Edwin Lonsdale, Chairman, ... Girard College, Phila.

PROGRAM.

ORDER OF BUSINESS.

Tuesday Morning, January 24, 1905.

Call to order at 9.00.

1. Roll-call of Members.
2. Reading of Minutes.
3. Appointment of Committee on Credentials.
4. Reception of Credentials of New Members and Delegates.
5. Reports of Specialists and Standing Committees.
   a. Botanist: Prof. W. A. Buckhout, State College, Pa.
   b. Pomologist: Cyrus T. Fox, Reading, Pa.
   c. Committee on Fruit and Fruit Culture: J. F. Boyer, Chairman, Freeburg, Pa.
6. Report of Committee on Credentials.
7. Election of Officers.
8. Unfinished Business.
9. New Business.
10. Miscellaneous Business.

Tuesday Afternoon.

Call to order at 1.30.

1. REPORTS OF SPECIALISTS AND STANDING COMMITTEES—Continued:

   a. Committee on Live Stock: D. A. Knuppenburg, Chairman, Lake Carey, Pa.

   b. Veterinarian: Dr. Leonard Pearson, Philadelphia.

   c. Committee on Apiary: J. W. Nelson, Chairman, Shawville, Pa.

   d. Sanitarian: Dr. Benjamin Lee, Philadelphia.

   e. Committee on Roads and Road Laws: P. S. Fenstemaker, Chairman, Allentown, Pa.

2. DISCUSSION: MARKETING FARM PRODUCTS,

   Opened by M. N. Clark, Claridge, Pa.

Tuesday Evening.

Call to order at 7.30.

1. REPORTS OF SPECIALISTS AND STANDING COMMITTEES—Continued:

   a. Microscopist and Hygienist: Dr. Geo. G. Groff, Lewisburg, Pa.

   b. Entomologist: Prof. Franklin Menges, York, Pa.

   c. Ornithologist: Prof. H. A. Surface, Harrisburg.

   d. Committee on Poultry: Norris G. Temple, Chairman, Pocopson, Pa.

2. "IMPORTANCE OF POULTRY AS A FARM PRODUCT."
   J. D. Nevins, Germantown, Pa.

3. "POULTRY AT THE ST. LOUIS EXPOSITION."
   Chas. S. Cornman, Carlisle, Pa.

Wednesday Morning, January 25, 1905.

Call to order at 9.00.

1. REPORT OF THE EXECUTIVE COMMITTEE.

1. REPORTS OF SPECIALISTS AND STANDING COMMITTEES—Continued:

   a. Chemist: Dr. William Frear, State College, Pa.

   b. Mineralogist: Col. Henry C. Demming, Harrisburg.

   c. Geologist: Dr. M. E. Wadsworth, State College, Pa.

   d. Committee on Fertilizers: H. G. McGowan, Chairman, Geiger's Mills, Pa.

3. "COMPOSITION AND USE OF HOME MANURES."
   Prof. E. B. Voorhees, New Brunswick, N. J.

Wednesday Afternoon.

Call to order at 1.30.

1. REPORTS OF SPECIALISTS AND STANDING COMMITTEES—Continued:

   a. Committee on Floriculture: Edwin Lonsdale, Chairman, Wyndmoor, Pa.

   b. Committee on Forestry: Dr. J. T. Rothrock, Chairman, West Chester, Pa.

   c. Committee on Cereals and Cereal Crops: A. T. Holman, Chairman, Nekoda, Pa.

2. "BREEDING CEREALS."
   Prof. Thos. F. Hunt, Ithaca, N. Y.

PROCEEDINGS OF THE ANNUAL MEETING OF THE STATE BOARD OF AGRICULTURE, HELD IN HARRISBURG, PA., JANUARY 24th AND 25th, 1905.

Tuesday Morning, January 24, 1905.

The Board met at 9 A. M. January 24, in the Auditorium of the Board of Trade, Vice President Jason Sexton in the Chair.

On motion of Mr. Hutchison, duly seconded, a Committee on Credentials was appointed by the Chair.

The CHAIRMAN: I will appoint as such Committee Brothers Herr, of Clinton, Clark, of Westmoreland and—

MR. HERR: Mr. Chairman, I am not eligible to serve on that committee.

The CHAIR: Has your term expired?

MR. HERR: Yes.

SECRETARY CRITCHFIELD: In view of the fact that there is likely to be a contest, I would suggest that the Chair appoint, at least, one or two of the older members of the Board.

The CHAIR: I appoint Brothers Clark, Hutchison and Snavely.

A member suggested that five was the usual number.

The CHAIR: Brother Blyholder, of Armstrong.

MR. BLYHOLDER: My term has expired.

MR. CLARK: I would suggest Mr. McGowan.

The CHAIR: Is he present?

MR. CLARK: Yes.

The CHAIR: Brothers McGowan and Temple.

Mr. Clark, the Chairman of the Committee on Credentials, requested the presentation of all credentials promptly to the Committee.

The CHAIR: What is the further pleasure of the meeting this morning?

MR. HERR: I move that we go on with the work, even if the room is cold.

The motion being seconded, it was agreed to.

The roll of members was called by the Secretary, and at this first roll-call and a subsequent call, the following persons answered to their names, a quorum being present at the first roll-call:

N. B. Critchfield, R. I. Young, Norris G. Temple, A. I. Weidner, S. S. Blyholder, H. G. McGowan, John A. Woodward, M. E. Conard,

S. X. McClellan, J. W. Nelson, J. A. Herr, H. V. White, C. B. Hege, Geo. G. Hutchison, Matthew Rodgers, W. H. Brosius, Samuel McCreary, H. C. Snavely, P. S. Fenstemaker, A. J. Kahler, W. C. Black, M. M. Naginey, R. F. Schwarz, J. Sexton, J. A. Eschbach, A. T. Holman, W. H. Stout, J. F. Boyer, E. E. Tower, J. Newton Glover, D. M. Pry and M. N. Clark.

The CHAIR: The next thing in order is the reading of the minutes of our last meeting.

The minutes of the last meeting were read by the Secretary, and, on motion, were approved as read.

The CHAIR: We are now ready for the report of Specialists and Standing Committees. First, the report of the Botanist, Prof. W. A. Buckhout, of State College, Pa.

The SECRETARY: Prof. Buckhout will not be here; his report, however, is in my hands. If it be desired I can read it.

At the request of a member, the report of the Botanist was read by the Secretary, which is as follows:

REPORT OF THE BOTANIST.

By Prof. W. A. Buckhout, *State College, Pa.*

The correspondence of the Botanist for the year 1904, has been very similar to that of previous years. The inquiries numbered 118; of which 44 were for the determination of plant specimens, 21 were respecting weeds, sometimes an example being sent with the inquiry, 15 concerning fungi, 14 forestry and related topics, 3 regarding seeds, and called for naming the kinds sent, 5 proved to be cases due to insect injury, while 16 were of a miscellaneous character.

For the most part these inquiries were so similar to those of previous years, and have been so frequently adverted to in previous reports, as well as in current periodicals, that it is quite unnecessary to reconsider them here. Let me say, however, before passing, that, while there is some evidence of a better understanding of what has already been done in such cases and of what is already in print and available concerning them in reports and bulletins published for general dissemination, a very large number of people seem to be quite ignorant of it, and we are prone to think that they have something entirely new and that their experience is unique and peculiar. In many cases the subject matter of their inquiry has been thoroughly considered before in all its aspects and is well treated of in some bulletins which can be had for the asking. Hence, I often refer an applicant to one of these bulletins and advise him to get it. In your Department of Agriculture, the series of bulletins, which has now reached upwards of 130, comprises a great

variety of topics, and in large part, is still available to deserving applicants. Similarly, the Farmer's Bulletin series of the United States Department of Agriculture has reached over 200, and comprises a practical working library of great value for the gardener, fruit grower and farmer. This literature should be more widely known and more frequently taken advantage of.

The particular cases which were somewhat out of the ordinary routine, and are worthy of individual mention are as follows:

(1) *Planting Black or Yellow Locust.* This tree is of great utility because of its rapid growth and the durable character of its wood. In earlier days it was in great request, and a locust grove was a desirable adjunct to a Pennsylvania farm. Some of these old groves are still in existence, sprout growth or occasional seeding producing new trees as the old were removed. But in large part they have been cut away and not allowed to reproduce. The general revival of interest in forestry has led to information on how to grow this tree.

Locust seed is generally easy to obtain and not expensive. It should always be well scalded before planting, and such seeds as do not swell up and soften, discarded, since they will not germinate, or, if so, very slowly and uncertainly. The young seedlings require no special care or handling and may be transplanted as easily as fruit trees. Sprout growth to be made most useful and productive should be carefully thinned out and trimmed during the first few years, else the crowding will be so great that no symmetrical trunks will be formed. The greatest drawback to growing locust trees, is in the attacks of the boring beetle, which often so riddles the wood as to make it useless or greatly impair its durability. It has been claimed that large plantations are not so much subject to the beetle injury as are single trees or small groups.

(2) *An interesting case of wood determination* came into my hands and was satisfactorily concluded. A small piece of wood, said to be part of a counter in an old store, was much disputed by local wood-workers, some calling it black cherry, while others claimed that it was mahogany. These two woods, although very different, so closely resemble one another in texture that the only positive determination is made by microscopic examination. A thin cross section of the specimen, compared with similar sections of known black cherry and mahogany examined under the compound microscope, showed clearly that it was mahogany, although the probability of this kind of wood in the particular situation where it was found seemed rather remote. The results were so striking that I made photo-micrographs of them. It is easy to see how a very important legal question of this character might arise.

(3) *Of the large number of plants* received for naming, but few were out of the ordinary. There is considerable new interest in the collecting and also the raising of various plants used in the drug trade. Those who are interested in this should by all means get the bulletins upon this subject; and, if cultivation is to be undertaken, it would be the greatest folly not to very carefully consult these epitomes of experience. The cultivation of ginseng, golden seal, etc., is so radically different from that of ordinary garden plants, that the novice will surely fail unless he prepares himself

thoroughly beforehand. There is much trickery and deceit, as well as downright dishonesty, among the dealers and exploiters of this industry.

Of the weeds of the year, the most interesting was dodder in grain and clover fields. It probably came in every case from seed impurity, and its growth was vigorous and destructive because of the favorable weather and soil conditions. Dodder is a noxious parasite, entwining and strangling the plants about it. Fortunately with us it seldom flourishes except in small patches often not more than a foot or two square. It should never be left to seed but should be cut, left to lie until dry, and then burned. A little oil sprinkled over it, if necessary, will make it more inflammable and secure a thorough burning from which no seed can escape. One or two weeds not commonly or widely known, and hence somewhat new on my list may, perhaps, be spreading, but I think not. It is very gratifying to know that the keeled garlic (Allium carinatum), which was detected in Bucks county, along the Neshaminy creek, a few years ago, does not seem to be gaining any ground On the contrary, I am informed by Mr. N. E. Arnold, of Grenoble, who first detected it, and gave the facts which I published in Bulletin No. 58, Pennsylvania State College Experiment Station, that it is not only not spreading, but seems to have sensibly lost vigor in the places where it was formerly growing; indeed it is now a rather rare plant. When we remember what a serious nuisance the common garlic (Allium vineale) is over the southeastern part of the State, we may well congratulate ourselves that this new intruder, which has much the same noxious qualities, seems likely to fail to become established and common. *Moss, as a weed in lawns*, is sometimes very troublesome. If the plot of ground is quite small the most satisfactory remedy is to remove the old surface and resod it; but for larger areas the only relief is to break up the surface and reseed it, using liberal amounts of fertilizer. Even then several years may be required in order to work a complete transformation and eradicate the moss. Mere pulling up the moss, accompanied by no other treatment is quite ineffective.

(4) *A number of specimens of depauperate* or malformed growths of leaf and stem were received from different sources. They fall under the head of peculiarities due to physiological causes; that is, to excess of water or some other food constituent, to some poisonous substance, or some unfavorability of light, temperature, etc. The conditions of plant growth, while they are somewhat variable and elastic, cannot be varied beyond a certain point without disaster. Too great heat or too little, excess of water or some fertilizing material react upon the plant causing it to produce curled or dropsical leaves, unduly shortened or elongated joints, or perhaps, an entirely unusual and abnormal form of growth. A good example of the latter was shown in a Japanese or Boston ivy. Normally this plant clings closely to a wall by delicately branching tendrils with sucker tips, and growing at the joints only. The plant under observation was killed back by the severe winter weather. When the new growth tardily appeared in midsummer, it did not develop leaves of normal size and shape until during the last few weeks of the growing season. Then, instead of the usual delicate tendrils, it

threw out a profusion of coarse, matted aerial roots, much like those of a trumpet creeper or English ivy. Other plants of the same species and growing under similar conditions of light and soil developed none of these aerial roots; and the most probable explanation of this particular case is in the unusual and unfavorable conditions under which this injured plant was forced to grow. Cases of this sort are not unusual, but they are commonly quite local, and of not much practical importance.

I am always glad to correspond with those who are interested in plants and plant growing and continue to offer the services of the Botanical Department of the College and Experiment Station to all reasonable requests.

The CHAIR: You have heard the report of the Botanist. What will you do with the report?

MR. HERR: I move that the report be received and placed on file. The question being put, it was so ordered.

The CHAIR: The next in order is the report of the Pomologist, Cyrus T. Fox, of Reading, Pa.

Mr. Fox not being present, his report was passed.

The CHAIR: The next thing is the report of the Committee on Fruit and Fruit Culture, by J. F. Boyer, Chairman, Freeburg, Pa.

Mr. Boyer read his report, which is as follows:

REPORT OF COMMITTEE ON FRUIT AND FRUIT CULTURE.

BY J. F. BOYER, *Chairman.*

The year 1904 may be set down as a record-breaker so far as the winter is concerned. The spring also was unfavorable; especially is this true of the strawberry, which was almost an entire failure in some parts of the State, while in other parts a partial crop was secured. Raspberries in most parts of the State were only about fifty per cent. of a crop. The Gregg and Cuthbert were, in many parts, killed to the snow-line. Blackberries also suffered from the effects of the severe cold winter. Wilson's Early and Early Harvest were killed to the ground, while such varieties as the Taylor and Snyder bore a medium crop. Currants produced a fair crop.

The apple crop was a full one in most parts of the State and the keeping quality was fine. Prices remained low and in many parts of the State the summer varieties were left to rot under the trees. Even some winter varieties did not yield enough money to pay cost of marketing, while choice varieties sold at a fair price.

Pears.—This fruit was a fair crop in most parts of the State.

The quality also was fair. Blight remains to be the most destructive element to this crop. The crop of peaches was an entire failure in hundreds of orchards, while other orchards in the same district bore full crops of first-class fruit; the keeping quality was extra fine. The causes of these various conditions was due to the severe winter.

Where the orchards were located at an elevation of about 1,000 feet above sea level, a full crop was secured, while in the same districts, orchards located at an elevation lower than 800 feet above sea level were not only winter-killed in the fruit buds, but hundreds of trees were killed entirely. Grapes in most parts of the State were a fair crop.

Quinces are not producing as well as usual and for that reason are planted sparsely.

Plums.—It is scarcely necessary to make allusion to this crop since it is so well known, that in 1904 the Japs won. It is, however, true that some varieties, such as Lombard and Imperial Gage and a few other varieties made a fair showing; but nothing in comparison to the Japan varieties. Especially is this true of Burbank, Abundance, Wickson and Willard. It remains to be known what the outcome will be when all the Japan plum trees planted at the present time come to bearing. I fear it will be like the Kieffer pear and Ben Davis apple, quantity, not quality.

Cherries.—This fruit was a fair crop in some parts of the State and an entire failure in other parts, like the peach, good and poor crops in the same locality. It does best on loose, warm, elevated soil. Sour varieties or that of the Morello type seem to be hardier than the sweets, from the fact that they can be grown on low grounds.

The year 1904 may be classed as a profitable one to the careful grower. Prices were fairly satisfactory for all fruits, except apples, of which too many common varieties were pressed on the market, together with a large per cent. of windfalls, blown down just a little before picking time.

There seems to be two classes of fruit growers. The first class are those who grow the fruit; the second class are those who allow it to grow. The first class are those who nurse the tree from the very day it is planted until the fruit is gathered. They are close observers, doing the proper thing at the proper time. They watch every detail in the business. Their fruit farms show thrift; and being a progressive class of people they are a credit to this Commonwealth. They are a class of people who will not listen to theory; they want practical everyday information. They don't want to be told how rapid the San José Scale increases, but how fast it can be subdued. They do not care to be told how fast or slow this scale moves from one tree to another; but want to know how soon it can be prevented from doing so. They do not care how long they live at this present day; but want to know how soon they can be destroyed. They want our practical men to come right down to business; less talk about its habits and more and better plans for its extermination.

The second class are those who plant trees, cultivate very little, if any, and depend on Providence to grow their fruit. They only visit their orchards about the time they expect the fruit to be ripe. Their

fruit, if any, nearly always goes begging for a market, and in many cases does not cover cost of marketing.

If there is any truth in the saying that the "big fish eat the little fish," I feel sure it can be truthfully said to hold in fruit culture on account of the scale.

In conclusion, will say that while the fruit, not properly grown, goes begging for a market and has a tendency to lower the market for the better class of fruit, yet there is absolutely no reason to feel discouraged, for as long as people eat, fruit growers will find ready for sale for their products at remunerative prices.

A Member: Mr. Chairman, I regard it as a very excellent report; I do not know what the custom is as to the adoption of it, but I think it is a report which we ought to be proud of.

On motion, the report was ordered received and placed on file.

The SECRETARY: In regard to the election of officers, perhaps it will be necessary for me to make some explanation. Our meeting was called to convene on Tuesday instead of Wednesday, for the reason that I received from a number of members of the Board communications suggesting that it would be a good thing to have the meeting of the State Board convene the same week with the Live Stock Breeders' Association. The first communication that I received in regard to this matter was from Mr. Bayard, the Secretary of the Live Stock Breeders' Association, and afterwards I received communications from a number of members of the Board suggesting that we have a kind of joint meeting, so that the members of each Board, the State Board of Agriculture and the Live Stock Breeders' Association, could have the advantage of the discussions at the two meetings.

In order that this might be accomplished, it was necessary for us to begin our meeting on Tuesday instead of Wednesday; and you will observe that the act of Assembly creating the Board provides that one-third its members shall go out of office on the fourth Wednesday of January in each year. If we should proceed to the election of officers at this time, the persons who are here as members-elect would not have the right to vote, because they do not succeed to their positions upon the membership of the Board until the others go out, which will be to-morrow, and I think, possibly, it would be better if this matter of the election of officers were to be postponed until to-morrow, so that no question could be raised hereafter as to the legality of the proceedings of the Board.

I make this suggestion and then the Board can do just as they think best in regard to the matter.

MR. HERR: Mr. Chairman, I move you that to-morrow morning at 9 o'clock be the hour fixed for the election of officers.

The motion was seconded by the Secretary, and the question being put, it was agreed to.

The CHAIR: The next order on the program is Unfinished Business. Is there anything to be brought before this Board in that line? There does not seem to be.

The CHAIR: New Business. It rather seems to me that that should be taken up after the organization of the Board to-morrow.

The SECRETARY: Yes; that would be better.

The CHAIR: If there is no objection, we will let that order of business lie over.

The CHAIR: Miscellaneous Business.

The SECRETARY: Mr. Chairman, I wish to say that we have had two very excellent reports presented to this Board, and I have no doubt that thoughts have suggested themselves to some of the members that they would like to express in the way of general discussion. These reports will be published and the discussions that take place upon them will also be published, and they make very valuable farm literature. I havn't any doubt that some very excellent things might be brought out and I hope that there may be a general discussion of these two subjects.

PROF. SURFACE: Mr. Chairman, I heartily agree with the Secretary in his suggestion as to the value of these papers, and wish to say that some things came to me while the report of the Botanist was presented. The point I have to make is this, that in that excellent report of our Botanist, mention was made of a very objectionable and pestiferous weed known variously as fire-weed, or the paint-brush, and also sometimes called hawk-weed. It is not what is properly known as hawk-weed. That is a different weed; but this is also sometimes known as hawk-weed. Reports have reached me that this weed grows so thickly that sheep can hardly get their noses down to the ground between them and there are entire fields that are being abandoned in certain sections in the southern counties of the State.

It is a plant that has some of the characteristics of the dandelion; the seeds are carried like dandelion seeds and they float out over a field of woodland and work down into the soil, so that when a fire sweeps over it, the seeds are not destroyed; they work down into the soil in the process of germination, then they spring up, and that is the way they are carried and spread over the fields where they are not subject to the usual methods of destruction. I know of no remedy for them except to keep them constantly cut off so as not to permit their blooming or going to seed. It will demand three or four cuttings a year for three or four years to keep them down.

Another weed that I have found starting generally over the State which is very destructive, is the so-called horse-nettle or Jerusalem cherry (Solanum carolinense). In Maryland that weed is so abundant that entire farms have been forsaken because of its presence there. It grows up to a height of a foot or a foot and a half and it has a blossom similar to that of the potato plant. It belongs to the same botanical family as the potato, tomato, nightshade, tobacco, the egg plant, the jimson weed and a number of others. It has a kind of branches on the stalk, branches and leaves that are long, sharp and prickly, and no stock will eat it. Its fruit

is a yellow berry full of seeds and about the size of the end of a man's finger, or about the size of a potato ball.

It is very hard to eradicate. It is a very serious pest, and it is important that every person should be able to recognize this pest, because if it once gets a start on one's premises, it will be very difficult to destroy. I have heard of persons who have been able to get rid of it by putting the field into cultivation with corn, potatoes or some other hoed crop, and just as soon as any green leaf of the weed starts, cut it down; keep the fields under the cultivator and keep it cut right down so that the leaves do not have a chance to start.

While I am speaking of this, I wish to say, Mr. Secretary, that this last summer I met with a gentleman who had an entire field which had been closely covered with Canada thistles. He had turned Angora goats into this field and found that they would feed upon the thistles, and when they got tired of feeding on them, he would sprinkle a little salt over them and the goats went at them again with apparently fresh relish. In that way he was able to keep them down. I think these three points are worth reporting.

DR. THAYER: I would like to ask if that is not poisonous to stock.

PROF. SURFACE: No; not poisonous to stock. Stock will not eat them. The proper name of it is horse-nettle, or Jerusalem cherry—the scientific name is Solanum carolinense.

DR. TOWER: Speaking of this paint-brush, Susquehanna county is full of it. In speaking of sheep not being able to get their noses down, that is correct. I have seen it where there were places half the size of this room where it was so thick they really couldn't do that, so that the statement is correct.

PROF. SURFACE: Mr. President, that is the way I learned it; I believe it to be the one of the most serious coming pests of the weed crop of Pennsylvania, and where I have seen it, it is just as I have described it.

MR. CLARK: The Committee on Credentials is ready to make a partial report, if you are ready to hear it.

The CHAIR: We are ready to hear the report.

A partial report of the Committee on Credentials was presented to the Board by the Chairman, which is included in the supplementary report on page 90.

MR. HUTCHISON: Mr. Chairman, I move that these gentlemen be elected as members of the Board as reported by the Committee.

MR. CLARK: I second the motion.

The motion was stated by the Secretary.

MR. HERR: I rise to a point of order, that you made yourself some time ago, whether to-morrow morning is not the proper time

to act on that report, at 9 o'clock. If we cannot elect the officers of the Board, it seems to me that we cannot take in members.

The SECRETARY (Acting as Chairman): That is right; the point of order is well taken, and any action upon this report will be deferred until to-morrow morning.

MR. CLARK: I would like to know if there are any other credentials to be presented. If there are, I request that during the day they be handed to some member of the Committee on Credentials so that if we see proper we can call the Committee together and get this matter arranged so that at a very early hour to-morrow morning we can make our report.

A suggestion was made by a member that the Board might act on the reception of delegates already reported on by the Credential Committee.

The SECRETARY: I think it will be all right to act on the reception of delegates.

List of delegates was read by the Committee on Credentials. (See report of Credential Committee, page 90.)

The CHAIR: What is the pleasure of the Board in regard to this report?

MR. CLARK: I move that this report be accepted and that these members be elected as delegates.

A member suggested that the name read as Jacob Boyer should read John F. Boyer.

MR. CLARK: I would make a word of explanation here. There is a gentleman on the floor who is a delegate from Indiana county in place of Mr. McHenry. He was called from his home about a week ago last Monday morning to go to California to the bedside of his oldest son, and he wrote back and asked them to send down a representative to take his place and have the same privilege as a member of the Board. Their society also sends in a similar request. We have no precedent to go by, but as a matter of courtesy, this committee will accept the gentleman to sit with us as a delegate from their society, if this organization sees proper to elect him. That was the sentiment of the Committee. He will only have the privilege of sitting and talking but will not be permitted to vote.

It was moved and seconded that the persons whose names were mentioned in this report be received as delegates and accorded the privileges of the floor. Motion agreed to.

The CHAIR: It has been our custom to appoint a committee to wait on the Governor and to notify him that the State Board of Agriculture is in session and that we desire his presence. As this has been the custom, we will appoint that committee now. We appoint as such committee, Mr. Blyholder, Mr. McClellan and Mr. Fenstemaker. They will please, during the forenoon sometime, wait on the Governor and let him know that the Board is in session and

desires his presence. Undoubtedly he is very busy, and it is doubtful if we can get him here with us, but I think it is well enough to let him know, as a matter of courtesy, that we are in session.

MR. HERR: I have an inquiry to make concerning the fruit business. We all heard that the members were requested at our last meeting at Bellefonte to bring samples of fruit for exhibition at the meetings of the Board. I just closed my institute Saturday afternoon, and was obliged to leave Monday noon in order to get here in time and the matter slipped my attention; but I expected at the time that the Secretary would notify the members in the program that a committee had been appointed for the examination and identification of fruit, a committee of experts, and a card notifying the members to bring in these samples of fruit. As I received none, it slipped my memory. I do not understand that that exhibition was only to be made at the fall meeting, when fruits are plenty, but it should be made now. It was also stated that a proper place would be provided to exhibit that fruit. I do not know—I haven't heard any of the members say that they have any fruit here. At the time that was mentioned, I thought that ought to have been on the program, so as to call the attention of every member of the Board to it.

The SECRETARY: In response, I can only say, that the Chairman failed, for some reason, to send the names of the committee, if such a committee was appointed, to the Secretary, and so I don't know that any committee has been appointed.

MR. HERR: I think the Secretary ought to appoint the committee.

The SECRETARY: The motion was that the Chairman appoint the committee. All committees are appointed by the Chairman. That is one of the standing rules of the Board, unless otherwise ordered by the Board.

MR. HERR: The Governor is the Chairman and unless his special attention was called to it, he had no knowledge of it.

The SECRETARY: The Secretary, as a matter of course, would consider that it was the duty of the Chairman who presided at the time the motion was passed. The Secretary is not willing to agree that it is his duty to do anything that is not prescribed, or that is not set forth by the Board itself. I can hardly conceive how it is possible that the gentleman from Clinton county would think that it was the duty of the Secretary to take charge of this matter.

MR. HUTCHISON: Was it not for the fall or summer round-up that these exhibits were to be made?

MR. HERR: The resolution did not say so.

The SECRETARY: No, it says "exhibits at meetings."

MR. HERR: To put all matters of doubt at rest, I move that the Secretary of Agriculture, who is the Secretary of our Board, be

authorized to appoint such committee for future meetings of the Board.

The motion being seconded, it was agreed to.

On motion of Mr. McClellan, a Memorial Committee was appointed by the Chair to take action on the death of Mr. George T. Henry, an ex-member of the State Board from Clarion county.

The SECRETARY: The whole proceeding in regard to this fruit business is quite clear in my mind, as much so as if it had occurred yesterday. When we were about to conclude the meeting of the State Board, before the round-up meeting was organized, Mr. Herr arose in his place and called attention to the very fine exhibit of fruit that was standing just to the left of the seat which was occupied by the Chairman, and he suggested that it would be a very excellent thing that exhibits of fruit should be brought here in order that persons who were well acquainted with the varieties of fruit growing in the State of Pennsylvania might name certain varieties that were brought, the names of which were unknown by the producers; and after talking a little while, upon this subject, he made the motion that a committee be appointed, whose duty it should be—this committee to be expert fruit growers—whose duty it should be to name the varieties that were presented to the meeting, and specially requested in his remarks that he be not placed on that committee for the reason that he did not consider himself an expert. I make these remarks in order to call it to the recollection of all, so that you may know just exactly when this matter took place. After he concluded, some remarks were made by Dr. Funk about a certain black apple that had come into Pennsylvania from Arkansas, and this apple he commended very highly.

A Member: Do I understand that farm products are included in this motion?

The SECRETARY: No, the exhibit there consisted of fruit and vegetables. There were some very fine potatoes up there, and Mr. Hutchison took occasion to suggest that possibly they were not all of the same size, and then the motion consisted of fruit only—that a committee be appointed to name certain varieties, as I have stated.

MR. McCLELLAN: The resolution that was just carried, carries with it farm products, does it not?

The SECRETARY: No, I do not so understand it. I understand that Mr. Herr's motion was confined to the inspection and naming of certain varieties of fruit not known to the producers; that was to be the duty of this committee of experts.

MR. HERR: I suggested only a committee on fruits; it is not likely that a committee who would be experts on fruits would be also experts on farm products. I want to make a suggestion that hereafter the programs call our attention particularly to that and state, if it is so that it can be, that a place will be provided for that fruit. If these matters are called to our attention, we should be likely to be more prompt in bringing our fruit, and I rise to second the motion

of Mr. McClellan that a Memorial Committee be appointed upon the death of George T. Henry, ex-member of the Board from Clarion county. I would also suggest that such other members of the Board as may have died during the year, be included, if there are any others; there are no others that I can recall.

The motion was agreed to.

The CHAIR: We are under the head of Miscellaneous Business. Is there anything further to be brought before the Board under this head?

The SECRETARY: The record that I made of that motion (the motion in reference to a committee on fruit at the time the motion was made, is as follows: "On motion, the Chairman was instructed to appoint a committee composed of experienced horticulturists and fruit growers to name the varieties of fruit brought to these meetings and to report on the exhibit of fruit and vegetables." I was under the impression when we were talking a moment ago, that the vegetables were not included.

MR. HERR: Well, that is all right, only I think you ought to have another committee for vegetables.

MR. HUTCHISON: Mr. Chairman, I move you that a committee be appointed by the Secretary on vegetables.

The motion being seconded, it was agreed to.

The Secretary made a statement that Dr. Thayer had been invited to come here and discuss a certain question: Are you prepared to read your paper?

DR. THAYER: Yes.

The SECRETARY: If there is no objection now, I shall be very glad to hear the Doctor's paper on the subject of "Clovers in Pennsylvania."

The CHAIR: It is a very important subject and I hope the Doctor will come forward and read it. I am very anxious to hear it myself.

Dr. Thayer came forward and read his paper which is as follows:

THE CLOVERS AS FERTILIZERS, INCLUDING THE PRODUCTION OF ALFALFA.

DR. I. A. THAYER, *New Castle, Pa.*

No problem confronting the farmer to-day is of more importance than that involved in the restoration and maintenance of soil fertility. When sufficient live stock is kept to consume the grain and

roughage produced on the farm, and the manure is carefully saved and restored, at least seventy-five per cent. of the fertilizing constituents removed in such crops will be restored to the land. A small part of the remaining twenty-five per cent. will be added to the available fertility through the disintegration of the insoluble compounds of the mineral elements of fertility, due to the operation of this decaying vegetable matter and the admission of air by frequent cultivation. Still, at best, there will remain a deficiency to be made up. In so far as the grain and roughage may be sold from the farm, instead of being consumed thereon, and the manure returned, of course, this deficiency will be augmented. To what extent the soil is depleted in the removal of some of the common farm crops, the following statement will show:

Fertilizing Constituents Removed. Pounds per Ton.

Crop.	Nitrogen.—lbs.	Phos. acid.—lbs.	Potash.—lbs.	Current value.
Potatoes,	4	1.4	5.8	$0 96
Red clover,	41	7.6	44	8 79
Corn stover,	20.8	6	28	4 82
Timothy hay,	25	10.6	18	5 18
Oats straw,	12.4	4	24	3 26
Wheat straw,	11	2.4	10	2 27
Buckwheat,	28	8.8	4.2	4 85
Corn,	36.4	14	8	6 56
Oats,	41	16	12	7 55
Wheat,	47	17.8	12	8 54
Milk,	9.6	3.8	3.6	1 72

Thus, if a clover field produces two and one-half tons of hay per acre, we remove from that acre 103.5 pounds of nitrogen, worth 515.45, 19 pounds of phosphoric acid, worth 95 cents, 110 pounds of potash, worth $5.50, or a total value of $21.90. If this were sold at $10 per ton and the value of the fertilizing constituents removed were deducted, there would remain $3.10 for the work of harvesting and marketing. But if fed to the dairy cow the protein alone in that two and one-half tons, at seven cents per pound; would be worth $25.69, and the manure returned would be worth $16.47. Of course, in the removal of the nitrogen contained in that two and one-half tons of clover hay we do not take the 103.5 pounds wholly out of the soil, since a large portion of this had been taken from the atmosphere, and in leaving the stubble and roots of the clover plant we probably leave the soil as rich in nitrogen as it was before the crop was grown; but we remove so much that might have been added to the soil. The real loss to the soil is probably to be measured by the value of the phosphoric acid and potash removed in the hay, namely, $6.45. But by feeding the hay and returning the manure to that acre, seventy-five per cent. of the total fertilizing value of the two and a half tons of clover hay, or $16.47 as stated, would be restored to the soil.

From the tabulated statement given, the results of removing any

crop can be estimated. Thus if from one acre we remove one and a half tons of timothy hay, we remove $7.72 worth of fertility. Hence, to maintain the soil fertility, so much must be returned each year. But if that hay were fed, and the manure returned to the field, there would be a deficit of but $1.93 in value.

Contemplating these facts in the light of the history of most of our farms in this State from which their products have been removed year after year for a century, is it strange that our soil is failing to produce the crops our grandfathers produced, or that we so frequently hear the wail, "farming does not pay."

How, then, are these losses to be made up? Not wholly in the use of commercial fertilizers, for they are too expensive and they give no humus to the soil. Not altogether by the use of stable manure, since there would be a deficit of twenty-five per cent. of what was taken from the soil, even if all products were fed; while the fact is that often not one-half of them is fed on the farm.

It will be well at this point to inquire into the state of potential fertility in the average Pennsylvania soils as revealed in the following analysis:

	Nitrogen.	Phos. acid.	Potash.
First 8 inches, per acre,	3,217	3,736	17,597
Second 8 inches, per acre,	2,669	1,816	6,843
Total,	5,886	5,552	24,440

These elements are chiefly locked up in the water-insoluble compounds that must be corroded or oxidized to be brought into soluable forms available to the roots of the plants. This may, to some extent, be accomplished by cultivation, turning the soil up to the air, breaking up the soil grains and thus exposing an increased surface to the action of oxygen. Another means of accomplishing this end is the introduction of decaying vegetable matter, such as green crops or stable manure, since in their decomposition certain acids are liberated that attack and corrode the mineral compounds and thus render portions of them soluble. This is true of all green manuring, and, together with the great value of such growth as cover-crops in preventing the waste of soluble fertility, such as the nitrites and nitrates that have been formed in great abundance during hot weather, shows the importance of always turning in a cover-crop or a sod whenever a seed-bed is prepared. The crying demand of our old soils for humus to retain moisture and stored sunshine for the growth of our plants, to improve the physical condition of the soil and make commercial fertilizers and lime more beneficial and less harmful, must be heard and heeded by the farmers of this State if their operations are to be profitable. Recent observations in some of the hitherto richest counties east of the mountains, discovered field after field whose surface soil is as colorless as is the earth six feet below, and whose soil grains are drifting in the winds

and washing down the hillside, piteously pleading for humus to give them the flush of fertility and plant roots to bind them in their place. This condition brought about by neglecting to restore humus, and often by excessive use of lime by which the little remaining humus was burned out, must be speedily changed or some of the proudest fields of the State will become practically barren.

The difference between our fields to-day and the same fields when our grandfathers looked upon the golden harvests that brought them forty bushels of wheat, a hundred and fifty bushels of corn ears or two or three tons of timothy hay per acre—the difference between these old eastern fields and the vast prairie empires of the west whose thundering train-loads of wheat and beef have sung a requiem to our hopes, may be expressed with the one word—humus. In the mineral elements of fertility no fields are richer than ours; but to unlock this fertility, humus, in all its vital functions, is an absolute necessity. And when we remember that the chief element in building the foliage of the plant through which carbon is gathered from the air, as well as in building the frame of the young animal, is nitrogen; that this element in the forms available for plants is not only the most important but the most expensive in the market, and the most easily lost, we see the importance of possessing a humus rich in nitrogen. With an atmosphere fifty-four miles in depth, four-fifths of which is nitrogen, it is not necessary to pay the dealer fifteen cents a pound for this element. The hand that guides this inexhaustable store across the plains has given us plants enabled by a mysteriously organized life to gather this nitrogen from the soil atmosphere and prepare it for the plant. The chief plants available in this latitude that possess this power are the clovers—the common red, mammoth, crimson, white, alsike, alfalfa and the vetches. The clover plant when turned into the soil accomplishes all that we have seen accomplished by the non-leguminous plants, and very much more. Its longer roots perforating the soil far below the average plow-depth, leave openings to admit the air, to break up the subsoil and oxidize the mineral compounds, at the same time the plant pumps back much of the escaping fertility, especially the phosphates and potash that was out of the reach of the plants and roots of other crops. But its chief superiority consists in the fact that it adds to the soil, not only a valuable bed of humus, but with it large quantities of nitrogen taken from the air, while the non-leguminous plants simply add to the soil what they had taken from it, with the exception of carbon.

The amount of nitrogen appropriated by the clover plant differs somewhat with varieties. An experiment by the Cornell Station showed that after three months and four days' growth the crimson had gained per acre 155 pounds of nitrogen, the mammoth 145 and the common red 103. The alfalfa and vetches are much richer. Thus a ton of red clover hay contains 41 pounds of nitrogen, alfalfa 48 and winter vetch 55. In the above experiment crimson clover had gained per acre as much nitrogen as would be found in thirteen tons of good stable manure or enough to produce sixty bushels of wheat with its straw.

It is not definitely known what part of its load of nitrogen is taken from the air and what part from the soil, but enough is

known to lead to the conclusion that the larger part comes from the air and is by so much a net gain to the soil. The probability is that these proportions will vary with the varying quantities of the soil nitrates. It is also a well established fact that the plant is enabled to secure its nitrogen by the bacteria, or micro-organisms, resident in the nodules on the roots, though their *modus operandi* is not certainly known. However, the conditions of such activity are well understood. Moisture, heat, alkalinity and the presence of air are some of the prime conditions that must be secured in order to promote rapid nitrification by means of the bacteria. The presence of phosphate and potash, with frequent cultivation, has been found to greatly promote their activity. These leguminous plants may exist in a feeble state without showing the existence of nodules, and presumably without their specific bacteria, especially in soils rich in nitrates; but in the measure of the existence of the root nodules, and hence of their bacterial action, will they fix the free atmospheric nitrogen and reach a full development.

Though the fertilizing value of the clovers may not yet be fully appreciated, they are coming into favor more and more; yet many are discouraged by their failures in attempting to produce it. How to secure a clover stand and bring it to maturity is the anxious and important question. My own experience and rather extensive observation leads me confidently to the conclusion that when we understand the nature and demands of the clover plant as well as we understand those of our common farm plants, we will have no more difficulty in growing it than we have in growing them. Poor soil will produce but poor crops of any kind. Unfavorable climatic conditions will injure any crop. Any other crop treated as unwisely as we have usually treated the clovers will result in as many failures as we experience in growing this. The fact is that clover is one of our hardiest plants. It takes hold on the earth, the air and the sun more fully than do the non-leguminous plants, and with the aid of its bacteria has a distinct advantage over the latter; and when its deep-root system is once developed can more successfully cope with frost and flood and drouth.

There are at least four supreme conditions of securing a full growth of clover.

1. The soil must be cleared of stagnant water, and this for two reasons:

First, because water in a compact clay soil will form ice that will ruin the plant by heaving. When water freezes it expands and must bulge upward. When this occurs the plants caught in it are lifted out of the soil or are broken. This, and not the low temperature, is what destroys the plant. If no stagnant water is present and the soil is loose when the ground freezes and the pressure is put upon it, the earth crumbles and the plant escapes injury. But in the second place, the water should be removed to admit air. As has been already stated, the bacterial activity cannot go on without the presence of air. Nitrification or the chemical union of oxygen and nitrogen cannot take place, of course, without the air containing oxygen. Hence the absolute necessity of an open soil free from stagnant water. Surface drainage will not always be sufficient. It must be remembered that the clover roots need a foot or two in

depth of earth and will not thrive in stagnant water. In compact clay soils, tile draining will be necessary to insure the production of clover. In some measure the result here sought will be produced by supplying the second condition, namely:

2. The addition of humus to the soil, either in the form of stable manure which is by far the best, or by turning in rye and winter vetch sown early in the fall after a summer crop has been removed. A top dressing of stable manure, well rotted, will be most effective. This will serve to retain moisture, so necessary to the young plant, raise the temperature of the soil, prevent heaving, greatly facilitate the work of the bacteria and render lime and commercial fertilizers far more effective.

3. If in testing the soil for acid with blue litmus paper, it is found that it is sour, which will be known by the blue paper turning red after having been placed in the moist soil for a few minutes, lime should be applied in moderate quantities, never more than fifteen bushels of freshly burned lime to the acre, evenly distributed; or twenty-five bushels of air-slacked lime. If Wampum ground caustic lime can be procured and applied with a drill, within three weeks from the time it was ground, it will give the best results, and in this form a thousand pounds will be ample. This should be drilled in a week or two before the seed is sown to prevent injury to the germinating seed. This will hasten the reduction of the coarse manure to available forms and greatly promote bacterial action which cannot exist in an acid soil. Should there be no evidence of acid present, four or five hundred pounds of the ground lime per acre will be of great advantage in mellowing the soil, liberating otherwise unavoidable potash, and as a direct food to the plant. The addition of a moderate dressing of bone phosphate or finely ground bone, with potash, if on sandy soil, will be found very profitable. But stable manure and lime should be the chief reliance.

4. For best results the clover must be treated as we treat other crops—given an open field and a well prepared seed-bed. We give the use of the field for a season wholly to corn or oats or wheat. We never think of growing a crop of oats and of corn, of rye and of buckwheat, or of timothy and of potatoes on the same ground at the same time. Yet, in the production of clover, a crop worth more than either, we have tried to grow three full crops on the same ground at the same time. We have thought it should have a "nurse crop." What we have meant by the term "nurse" it is difficult to understand. If we thought it needed protection from the sunlight we forgot the fact that sunlight is one of the essential conditions of its growth. It needs a large amount of moisture—452 tons for the production of one ton of dry matter—fertility and sunshine, and a "nurse" that deprives it of these is not a nurse, but a robber. True, we may secure a partial stand where the wheat or rye is weak, and especially if the field had been top-dressed with stable manure; and if our object is to secure a light stand of plants between the tussocks of timothy, this may accomplish that purpose; but a full, even stand is the exception, and in our depleted soils is impossible. Even on the best of soils where I have been able to secure what was regarded as a good stand, I found an open land at the side of

the wheat field that had been seeded to clover at the same time, from five to ten times as many clover plants on a given area as grew among the wheat and timothy. Then again, our custom of sowing clover seed on a honey-combed soil in February or March often exposes the young plants to destruction by frost. Even where a comparatively fair stand is secured, the plants that have struggled for existence until harvest time are weak from having been deprived of light and moisture by the "nurse crop," and when suddenly exposed to the scorching sun and the drouth of July, they perish.

If the field cannot be given exclusively to the clover and a proper seed-bed prepared in the spring, a wheat or rye stubble field may be prepared early in July by burning off the stubble and thoroughly harrowing it. If a cutaway or disc harrow can be used the burning will not be necessary. As soon as the grain can be moved the soil is friable and in the best condition for pulverizing. Sow on this fine seed-bed at least fifteen pounds of red or mammoth seed, or eighteen to twenty pounds of crimson clover, and harrow in thoroughly. If the soil is loose and dry, especially if it be a sandy loam, it should be rolled before the last harrowing. The crimson may be sown on an early potato field if the potatoes can be removed by the first of August. This will prove an ideal seed-bed. Fair results may be realized by sowing it among corn before the last cultivation, provided the corn is of a small variety and sowed north and south four feet apart.

As shown in a very decisive manner on my own farm in several instances, there is a wide difference between the growth of crimson clover on ground that had previously raised it for two or three years, and that on which none had been grown, owing to the fact that the first had become well inoculated with its peculiar bacteria, while the latter seemed to have very few. On the first there was a complete stand three or four times as large as that on the second, and the root nodules were proportionately large and more plentiful. In rare cases it has been found necessary to inoculate the field with soil taken from a good clover field and drilled in at the rate of two or three hundred pounds to the acre. Careful experiments have shown this to be successful and thoroughly established the necessity of these bacteria to the full development of the clover-plant. But in the case of the common clovers this will seldom be necessary. Supplying the conditions already named will usually insure a fine stand the first year and inoculate the soil for better crops in the future.

A very important measure in developing the root system and adding another security against the heaving out of the young plant, is clipping it early in September. No matter when sown, or whether it be the first or second year, this measure will be found of great advantage. Unless needed for seed or to plow in for green manure, the aftermath of red clover should be clipped just before it begins heading, thus turning the energies of the plant to the development of the roots. I have seen many promising crops ruined by the following spring through neglecting this. This clipping, if sufficient to smother the plant, may be profitably fed to the dairy, or to sheep, swine or poultry. It will be found, as I have repeatedly observed, that the July sown clover thus treated, will present a bet-

ter developed root system by the first of December than will be found in the March sown clover under the care of the robber nurse.

Since I am considering the clovers with special reference to their fertilizing value, I cannot close this subject without special mention of the queen of my fields—the crimson clover. For eight or nine years I have grown this exclusively as a fertilizer. Wherever a vacancy occurred on ground devoted to early vegetables, among sweet corn, cabbage, etc., I sow in the seed, from early in July until the middle of August, and always have a great mass of plants to turn in by the latter part of the following May. This ground is then rolled down compactly and planted to the later vegetables, potatoes, corn, cabbage, celery and the like. I have thus increased the yield of potatoes eighty-two bushels per acre in comparison with unclovered land, otherwise as fertile that lay beside it. In addition to what has been said on the production of the clovers in general, I mention somethings especially necessary in the production of this. The seed should have been grown in the north from plants thoroughly acclimated. Every farmer may grow his own, and it would be profitable for him to do so. It is an annual and need not interrupt a rotation of crops on the farm; but to be ready to turn in in time for a crop of corn or potatoes it should be sown near the middle of July. If but a light growth is secured, or even if it should be largely destroyed by heavy freezing during the latter part of winter or early spring, as a cover crop and a gatherer of nitrogen, it will have paid tenfold its cost of production.

The vetches stand in a class by themselves, not only because that in their nitrogen-content they rank the highest, but because they are the most hardy to resist unfavorable climatic and soil conditions. The hairy or winter vetch is the leader. Sown in September it will form a mass that will perfectly cover the ground during winter and be ready to turn in anytime in May. It is better to sow it with rye, since it is of a viney nature and will be held up by the rye convenient for plowing in. Thirty to fifty pounds should be sown to the acre with a bushel of rye.

Logically, I might close my lesson here; but the wants of feeders as I have observed them throughout the State lead me to add, as a sort of appendix, a word on the production of alfalfa. The enormous sum paid every year by dairymen and others for mill feeds and by-products, and the consequent small margin of profit left to the feeder, calls louder and louder for such feeds as can be grown on the farm, meet the demands of an efficient ration, and at the same time enrich the soil. From all the evidence before me, and it is considerable, I believe that such a ration may be found in alfalfa and corn. A test was recently made at the Maryland Experiment Station. Eight cows, as nearly alike as could be selected, were divided into two classes. Four were fed alfalfa and corn meal. The second four were fed corn silage, wheat bran, gluten meal and linseed meal. At the end of four weeks the first four fed alfalfa and corn meal had produced two hundred pounds more milk than had the second four. Then the feed was changed. The second four were put on alfalfa and corn meal, and the first four were fed the silage, bran, gluten and linseed meals. At the end of another four weeks the alfalfa and corn-fed cows had produced seventy-five pounds more milk than had the silage and bran-fed cows.

A Nebraska test showed that pork produced by feeding corn and wheat bran cost $3.75 per hundred. By feeding corn alone it cost $2.97, and by feeding corn and alfalfa the cost was $2.62 per hundred. The same station reports the results of feeding steers on three different rations. The first class was fed corn and prairie hay and gave a profit of thirty-eight cents per head. The second class was fed on corn, oil meal and corn stover, and gave a profit of $6.53 per head. The third class was fed alfalfa and corn, and gave a profit of $8.66 per head. About once a month I have an opportunity of seeing a carload or two of horses brought to our market from Nebraska, Dakota, Kansas and Colorado, that have had no feed since their weaning but alfalfa and corn. I have never seen more superbly developed horses in this State.

Thus it appears that milk, beef and pork can be produced more cheaply with alfalfa and corn than with our present expensive feeds. The question that now comes to us from every part of the State is, can alfalfa be produced here, and how? My own experience has been limited to two sowings. Though successful, I do not base my conclusions on this. My observation of the experiences of others, each under conditions quite different from my own and from one another, leads me to believe that on a large majority of Pennsylvania farms alfalfa can be successfully grown. In a careful examination of many farms throughout three-fourths of the State, I have not found one containing more or less soil suitable to alfalfa. In some of them such soil is very limited in area, there being possibly not more than two or three acres, in others, one-half or all the land being adapted to the plant. This fact, together with the importance of its possession, must be my excuse for introducing the subject in this connection, and should be the farmers' incentive to the most patient and painstaking efforts to produce it. The production of from four to six tons per acre of a food worth so many tons of wheat bran, and that with the corn our farmers can raise will constitute a healthful and efficient ration for all live stock, and at the same time double the producing power of the rest of the soil, is an object worthy of our highest efforts.

Since the publication, by our Department, of Bulletin 129, on "Alfalfa Culture in Humid Lands," by Mr. Wing, it is not necessary for me to consume much time in giving directions for its culture. I limit myself to the briefest statement of the conditions of its growth.

A second bottom six or eight feet above the high water level is usually the best, especially if it be an alluvial soil. The subsoil should be easily permeable by the roots, not necessarily a loose gravel, but such as can be readily cut with a spade. The surface should be thoroughly enriched with stable manure. If the soil be clay, coarse manure should be turned in with deep plowing late in the fall. If underlaid with a solid subsoil, a subsoil plow should follow the turning-plow. As soon as conditions will permit in the spring, another application of well rotted stable manure should be made and well harrowed in. This soil and manure should be as clear of weed seed as possible, especially of the finer grasses, such as fox-tail and knot grass, for no other plant is so easily destroyed by weeds as is the young alfalfa. Lime must now be applied as for

other causes. After working the seed-bed to a fine, firm condition it should be inoculated with the alfalfa-bacteria by drilling in about two bushels of soil taken from an old alfalfa field. This will be absolutely necessary to secure a satisfactory stand from the first seeding. The cultures prepared for this purpose have not always brought the results intended; and since the alfalfa soil can readily be procured at small cost, this is the surest and most economical procedure. Let these three applications be remembered as the supreme essentials to the successful production of alfalfa—stable manure, lime and inoculated soil.

The time of sowing the seed may vary from the last of April in the southern half of the State and the middle of May in the northern half, to the middle of July or first of August. Where the soil is reasonably clear of weed seed the earlier date is preferable. Where this is not the case the ground should be cultivated frequently to destroy the weeds and save the moisture until midsummer. Twenty to twenty-five pounds of seed per acre in most of the fields of this State has been found by experience to be about the right quantity which, as a rule, should be sown without the so-called "nurse crop." I have practiced both methods, and while on the more weedy portions of the field the nurse crop seemed to check the growth of weeds somewhat, it also appeared to check the growth of the alfalfa as well. Sown alone it proved much more vigorous and plentiful. When the ground is dry, or on a sandy loam, it should be rolled after sowing the seed and then lightly harrowed, or what is better, worked with a weeder.

In about six weeks or less from the seeding time the plant will attempt to go to seed. When the first blossoms appear the crop must be clipped. If allowed to run up to seed now it will be ruined. In about the same length of time it will again begin to bloom, when it must receive the same treatment. If sown in the spring it will also need a third clipping in September. These clippings will not only prevent its seeding, but will discourage the weeds, mulch the soil and increase the root development. In the second year the cutting of the crop of hay will be done at about the same periods at which the clippings were made, when we expect a half crop or more, a full crop being secured the third year.

Should fine grass appear among the plants after the first year, it may be largely destroyed by disking or running over the field with a spike-tooth harrow. This should be done just after cutting the first crop early in the summer, and will not only largely destroy the grass, but will greatly benefit the alfalfa by loosening up the soil and preserving moisture. Sometimes, without any obvious cause, the leaves will turn yellow and begin to fall, the plants threatening to die out. It should then be mowed off; after this it will frequently grow up rapidly and assume a healthy appearance. Should this feebleness manifest itself early in the life of the plant, and not yield to clipping, one or more of four causes may be suspected, either the roots have reached an impervious subsoil or stagnant water, or the soil is lacking in lime or bacteria. The discovery of the cause will indicate the remedy.

It must be remembered that the production of alfalfa in Pennsylvania is yet in the experimental stage, though there are many

fine fields in the State. We doubtless have much to learn concerning it. But I am persuaded that an intelligent study of the plant, with repeated trials, will result in its production on most farms in the State. And when once the clovers are plentifully produced and turned into our soils, and corn and alfalfa are grown as our principle feeding-stuffs, a new era will have dawned on Pennsylvania agriculture, and the sad refrain, "farming does not pay," will be heard no more.

The interest in this subject that I witness in many parts of the State, the intelligence and enthusiasm with which trials are being inaugurated, leads me to believe that the light of that era is now on the eastern sky and that my eyes shall not close upon the scene until that sun has arisen and the net profits of agriculture shall have been doubled.

MR. HUTCHISON: I would like to ask the Doctor a question if it would be in order. Doctor, do you know the analysis of alfalfa, what it is in fat and protein?

DR. THAYER: Alfalfa hay would analyze 220 to 260 pounds of protein. The lowest estimate is 220 pounds, ranging from that to 260 pounds of digestible protein.

On motion, a vote of thanks was extended to Dr. Thayer for his most excellent paper.

MR. HUTCHISON: Doctor, had you ever any experience with alfalfa meal?

DR. THAYER: No, not of my own; it is being used, though, greatly, and said to be an excellent feed in mashes for hens and for cows also.

MR. HUTCHISON: In December, I found that they were selling alfalfa meal and it was giving good results. That was the first lot that I came across in my work, and the dealers told me that it was very popular and they were beginning to use it; that the farmers were buying it and using it with good results.

The CHAIR: What is alfalfa meal and how is it made?

MR. HUTCHISON: It is gound-up alfalfa, I presume.

The CHAIR: Just the stalk, green?

MR. HUTCHISON: The green stalks. We had a sample of it at Bellefonte; Mr. Campbell presented it. There was a large quantity I came across in Erie; it was being sold to all their farmers and they were pleased with it. It was an experiment they said, in buying this lot.

COL. DEMMING: Has the author of the paper observed the difference between alfalfa-fed and corn-fed beef?

DR. THAYER: No. I could not distinguish the difference in the beef submitted, whether it was fed on corn or on alfalfa.

COL. DEMMING: My experience is somewhat different. I spent

five months in the alfalfa section this last year, and I observed that the alfalfa-fed beef was somewhat different, whereas the corn-fed is the best which we have in that section of the country. The alfalfa-fed beef is noticeably tougher than that which is corn-fed. It may be that I was unfortunate in my location, but that was my experience.

MR. NELSON: Mr. Chairman, some one claimed he could tell the difference in honey of black and Italian bees by the taste; of course it would not be worth while to argue with him on that point.

The CHAIR: (Addressing Dr. Thayer) I noticed that you mentioned the growth of some plants or some crops where the use of fertilizer might be harmful. Now we would like to know where and how fertilizers might be used that would be harmful to crops.

DR. THAYER: In soils chiefly devoid of humus, all those chemicals, especially lime, act deleteriously, doing more harm than good oftentimes, especially where you have got considerable humus they are so much more active.

The CHAIR: Another matter, Doctor. Would it be a good plan to attempt to grow alfalfa after cow-peas where you can grow a good growth of cow-peas.

DR. THAYER: It would be a good idea to precede alfalfa with cow-peas.

The CHAIR: Would you advocate the inoculation of the soil before you would grow cow-peas?

DR. THAYER: O yes; I am ready to attempt some experiments another year in that line.

MR. HUTCHISON: What amount of red clover do you sow to the acre?

DR. THAYER: About fifteen pounds when I have an open field.

The CHAIR: Would you mix any timothy with it at all?

DR. THAYER: No, not with mammoth; if you sow mammoth clover, that ripens at the same time with timothy. The first year or two timothy stands more or less in tussocks; mammoth clover will fill those spaces and you will get about as much timothy as if there were no clover there. Where you want clover for that purpose, use the mammoth and sow it right with the timothy. We only cut the mammoth clover twice. Alsike clover is said to be a diurnal and is very uncertain; sometimes it is diurnal on moist clay soil. It will last for a good many years.

MR. HERR: I would like to ask why it is that very many of our farmers recommend sowing at least fifteen pounds of clover seed to the acre, and my experience has been that I can grow just as much with eight pounds to the acre. I think my experience will tell me that I can grow as many tons of clover hay of a good quality

by sowing eight pounds to the acre, as I can with fifteen provided the field is in condition to receive that clover—in good condition.

The CHAIR: Any further discussion on this question? It seems to me, Doctor, that alfalfa certainly ought to grow where we can grow a good crop of crimson clover. We find our neighbors are having lots of trouble to grow alfalfa after crimson clover.

DR. THAYER: O, yes, the crimson has no function really to it except to nourish the soil.

MR. HERR: Prof. Cooke does not give us much encouragement unless we have a very dry soil. The long-rooted alfalfa does not flourish well in water. He thinks the ground is scarce that is adapted to its culture where, if we dig a post-hole four feet deep, water will not settle.

DR. THAYER: Recent experiments show that clay soil is best.

MR. CLARK: What are the conditions of these alfalfa fields at the present time?

MR. HUTCHISON: I can hardly answer that question. A neighbor near me raised a crop last year, but I paid more attention to it the first year, because it was an experiment and a successful one.

The SECRETARY: Before contracting with Mr. Wing to prepare a bulletin upon the production of alfalfa, I invited correspondence from farmers all over the State of Pennsylvania. I asked them to let me know whether they were raising alfalfa; and I received answers from a number of farmers in different sections of the State stating that they had tried it, and that they had been fairly successful. I remember, from the county of Westmoreland, a reply from a gentleman out north of Mount Pleasant, who is cashier of the Farmers' National Bank.

MR. CLARK: Mr. Mullin?

The SECRETARY: No, that is not the man; it was some man out north of town, north of those churches; I can't tell his name. He said to me that his experiment had proven very successful; and so all over the State we have reports of men here and there, stating that they are meeting with success in the production of alfalfa in a small way.

MR. NELSON: The subject of clover is interesting because it brings out a great many points that do not seem to be understood. No clover seed will make a perfect crop on new land up our way until about the third crop. Professor Cooke could not understand that. If the Doctor can give us any points on that, I would like to have it brought out. Is it not possible that there is something lacking in the ground that prevents its germinating?

DR. THAYER: I recommend that the seed be obtained from the northwest, from Dakota, Nebraska or, as a last resort, Utah.

The SECRETARY: I would like to inquire whether the sweet

clover is not something we ought to avoid just as we ought to avoid the wild carrot.

MR. NELSON: I would like to have that condition of things at my place; I would much prefer sweet clover to wild carrot.

The SECRETARY: Will stock eat it?

MR. NELSON: Well, mine would not eat it.

The SECRETARY: I have never seen an instance where stock would eat it.

MR. NELSON: Some of our bee-keeper friends claim that where stock gets accustomed to it, they will eat it, especially hogs; it would be very valuable if they would eat it.

The CHAIR: In accordance with a previous motion, the Chair will appoint as a Memorial Committee, Messrs. McClellan, Herr and Hege. I am also requested to state that there are a number of members of the Board who are much interested in the bill before the Legislature in regard to the new game law, and they would like to meet together and have a discussion over the matter, in regard to that law. They are requested to meet here and talk that over; perhaps they better meet immediately after adjournment.

MR. BLYHOLDER: Mr. Chairman, we waited on the Governor at his office, and found that he is at present out of the city and will be unable to be here before to-morrow forenoon.

MR. HUTCHISON: I met a great many members and senators who made inquiry in regard to our meeting, and the program. If it were possible to place a program in each of the postoffice boxes on the "Hill," it might be the means of informing them and might result in having some of them meet with us.

The SECRETARY: We will try to do that so far as we are able.

On motion, the meeting adjourned to 1.30 P. M.

Tuesday Afternoon, January 24, 1905.

The meeting was called to order by Vice President Sexton.

The CHAIR: The first thing in order is the report of the Committee on Live Stock," D. A. Knuppenburg, Chairman.

Mr. Knuppenburg being absent, his report was passed.

The CHAIR: The next thing in order is the report of the Veterinarian, Dr. Pearson, of Philadelphia.

The SECRETARY: I received a letter from Dr. Pearson stating that it is impossible for him to be here to-day.

The CHAIR: The next thing in order is the report of the Committee on Apiary. J. W. Nelson, Chairman.

MR. NELSON: Mr. Chairman, on account of institute work, I haven't had time to take this matter up until night before last, and what I have done I have had to do between times.

Mr. Nelson then read the following report:

REPORT OF THE COMMITTEE ON APIARY.

By J. W. Nelson, *Chairman.*

In my report, as Chairman, I must begin with the winter of 1903 and 1904, one long to be remembered and never to be forgotten by the apiarist, as well as the pomologist, for their interests are inseparable; a winter the like of which we hope never to have again, commencing with cold and dry weather in October and ending in cold, wet weather in April and May. The first flight my bees had from October 25th, was on January the 23d, or about 90 days, during which time the temperature twice was down to 32 degrees below zero; but they were all alive at latter date, but much reduced in numbers. The next fly, February 7th, an interval of 15 days, temperature at 40 degrees 7 A. M., 52 degrees at 1 A. M., still all alive. The temperature was below zero eleven times in February. March the 13th, some bees flew, an interval of 35 days, 5 per cent. dead. The next nice day was the 7th of April, an interval of 25 days, making an almost continuous confinement of 160 days. Most of the rest were very weak, then followed rainy weather till the 16th of June. My winter and spring losses were about 75 per cent.; but I think at least two-thirds of the loss can be charged up to foul brood.

The keeping of bees has a double purpose: The direct profit and the necessary pollenization of fruits and flowers. Before the snow is all out of the lanes or the frost out of the ground, the apiarist will, if he watches closely, observe the bees carrying in natural pollen. Where do they get it? Off of the willows along the streams which produce only pollen, as most of those trees and plants which come first produce only pollen, the percentage of nectar increasing as the season advances till it reaches its highest point in basswood the first week in July. Next to the willows come the aspens, the soft maple, the elm, the sugar maple, the walnuts, the oaks, and other hardwood trees, producing mostly pollen, and the latter mostly honey; nature thus giving a larger amount of pollen in the spring to stimulate brood-rearing so that the necessary amount of bees may be present when fruit blooms to fertilize the flowers and thus insure a crop.

The extremely wet weather prevented the bees this year in fruit bloom doing much more than to fertilize the flowers, and, although the white and alsike clover contained the most bloom I ever saw.

there were few bees on it and no surplus from that source. August was the only month with us that could be called a good month for honey, as September was too cool for honey production, and on the 21st, a big frost closed the season, which I consider a very poor one. Still the bees made at least 50 per cent. on their value, which is more than I can make on any other branch of farming. On the 25th of May I received some bees from Alabama. Out of 14, 3 from nuclei, four were entirely destroyed and at least 33 per cent. of the bees of the other 10 were dead and a good portion of the brood destroyed leaving, save two from nuclei. In spite of the poor season, these nuclei became strong, full colonies and gave me 28 sections worth $4.00 a piece. If this can be done in a cold, wet season, unfavorable for honey, without extra care, what can be done in a good season with favorable weather in fruit bloom, raspberry bloom, basswood, buckwheat and fall flowers. With us the much talked of golden-rod is hardly a honey-plant as the bees do not often work on it. I have seen fields yellow with bloom and not a bee on it.

COLOR OF HONEY.

The early honey is mostly of an amber color; white clover and basswood, white. I have had honey during chestnut bloom of a blue color, and fall flowers in September on mountains and ravines the whitest of all. Buckwheat honey is very dark colored and is much admired by many. I get for it as much per pound as for white honey. Bees work mostly on buckwheat between the hours of 9 and 12 A. M.; on sumac until dark. There is a clear, white honey made in June which is very bitter to the taste but is not injurious to the person. I have had samples analyzed in at least four different years, but could never find what it is made from, all attempts to find out having proved to be merely guesswork. There is also another honey of a black color that the bee-keeper would be glad to get rid of, but as it generally comes in very small quantities and is mostly used in brood-rearing, it does but little harm, if our friends, the chemists, do not succeed in getting it classed as an adulterant. If they do, it will do us no end of harm, for no law that can be passed will prevent the bees from working on the excretions of insects (falsely called honey-dew) when the nectar in flowers is scarce and no bee-keeper could swear that his honey did not contain some of the stuff, nor is there any method by which he could keep it out.

I have introduced the subject of bee-keeping in all of my institutes and find the farmers interested, and as I pass around among them I see some beehives mostly empty, and when I inquire the cause the answer is, "Oh, they just died;" and that brings me to the question of legislation. We need a law and it should be a very stringent one to eradicate foul brood. I am not in favor of a county law giving the authority to the county commissioners; I think it would not be satisfactory. But what I think would be better, would be to divide the State into districts with a foul brood inspector in each district, nominated by at least five of the leading bee-keepers of his district, approved by the State Association and appointed by the Governor, whose duty should be regulated by a commission of ten members, five of whom are to be appointed by the president and five elected by the association, all of whom must

have a complete understanding of the disease and its treatment; said commission to be presided over by the president of the association. The inspector to be appointed in each district must have at least five years experience with not less than twenty-five colonies of bees at all times, in addition to a complete understanding of bee diseases, there nature and treatment, whose duties shall commence on the 15th of May and end on the 15th of September, and whose compensation shall be $5.00 per day and expenses for time actually expended, and shall be paid monthly by the State on sworn statements made by him and itemized. The inspector shall be appointed annually and shall have the authority to destroy all box-hives, and all other hives he may find infected, giving the owner ten days notice to transfer and disinfect his bees in which he shall assist the owner. In case of refusal to comply with the law by the owner, he shall proceed to destroy and disinfect said property and shall have the power to arrest anyone who shall interfere with him in the discharge of his duties; no compensation to be, in any case, allowed as said property is entirely worthless. I would also recommend some legislation that would afford some relief from the exorbitant rates and careless handling of bees and honey by the express companies.

During the year the bee-keepers of the State met at Williamsport and formed a State organization for mutual protection, and to secure legislation to stop the ravages of foul brood which threatens to destroy the industry in the State. A meeting was also held at Harrisburg in December.

In conclusion, let me ask the Department to place in the lecture course of farmers' institutes, men who understand bee-keeping and who can give practical instruction on this important branch of agriculture.

The CHAIR: What will you do with the report?

On motion, the report was received and placed on file.

The CHAIR: We will have the report of the Committee on Live Stock, D. A. Knuppenburg, Chairman.

Mr Knuppenburg read his report which is as follows:

REPORT OF THE COMMITTEE ON LIVE STOCK.

By Damon A. Knuppenburg, *Chairman.*

In making a report upon the live stock of our State, your Committee feel that they cannot do better than to repeat, from the excellent report of Dr. M. E. Conard made in 1902, his statistics derived from the best obtainable sources of information, of the number and value

of the live stock owned within the bounds of our great Commonwealth in 1900. The statement is as follows:

788,000 horses (over two-thirds of which are used on farms), @ $75.00,	$59,100,000
61,167 mules (nearly two-thirds of which are used on farms), @ $80.00,	4,893,360
1,200,000 dairy cows, @ $35.00,	42,000,000
750,000 steers, growing dairy stock, and bulls, @ $29.00,	21,750,000
830,000 sheep, @ $3.90,	32,270,000
1,100,000 swine, @ $7.61,	8,571,000
6,500 goats, @ $3.50,	22,750
Poultry,	8,236,000

It is safe to place the value of horses from $10 to 25 higher than above stated. There is no immediate fear of overstocking the market with good horses, and at the present prices, we suggest that our farmers give more attention to their raising heavy draft horses that find a ready sale at from $150 to $200, costing but little more to raise than a prime steer and the margin of profit is much larger.

The heavy work of the farm must necessarily be performed by the horse and his hardy relative, the mule, and in view of the relatively small number of the latter, as shown by the statement, I do not hesitate to affirm that that there is plenty of room on the farms and in the mines of Pennsylvania for more mules. The average price is always a little better than for the common grades of horses, while the cost of rearing must be substantially the same as that of a horse.

Our domestic animals are the bed-rock of all good farming, and there should be enough of them to consume the bulk of the products of the farm, and as much more as possible. The gentle-eyed cow is the Pennsylvania farmers' best friend and ally. In fact, without her aid and assistance the farm would soon become an unproductive waste. Every farmer should get acquainted with his cow, study her, learn her genealogy and see that she comes of a good family. Family counts with her as much as with human. The sire should be pure-bred and intelligently reared.

There will be no signal success in stock raising, nor in any other business, without knowing how to do it. Intelligence and ability gleaned by careful thought and study has a money value that shows most satisfactory results. The man who is diligent in this way will stand among the kings, and his home will be a fit dwelling-place for the royal family. No farmer should be satisfied until he knows just what each cow and head of live stock is earning for him, and is in condition to select and propagate the best.

Do not neglect the calves. Nature has given them a voracious appetite and splendid digestion. Work them both for all they are worth the first year and you lay the foundation for something worth while for the future. Inadequate food for the growing young animal stunts the growth and detracts so much from the value of maturity that it is always poor economy.

We would impress upon the farmer the wisdom of Dr. Conard's words when he says, "the necessity for raising our own supply in order to prevent the importation of disease into our premises," is

just as applicable to our pigs as to our dairy cattle. The pig will always hold his place as a source of profit to the farmer as well as at the trough, and will feed the man who feeds him. Get the best breeds of swine, and give them the care they need and the response will always be generous.

The present high price of wool gives encouragement to sheep farming. The sheep must be well cared for, and if intelligently and continually looked after will be a source of satisfaction and profit.

The farmer's wife is usually the expert in poultry raising and the profits of the same should be her personal perquisite that she may have her own source of income. The aggregate production of the American hen is something fine and monumental. There are two things though that she can't do. First she can't crow and second she cannot lay eggs enough to glut the market. But she will do her best.

The present healthy condition and freedom from epidemics of our live stock throughout the State is largely due to the unceasing vigilance of our State Sanitary Board. In the case of our domestic animals, we have always at hand the invaluable advice and service of the trained veterinarians, men like Dr. Pearson and Dr. Conard, who can help and save the day when we have done our best without avail.

Farmers, study your domestic friends; learn all you can about their habits, needs and capabilities. Rear them at their best. Train them for your purposes. Let them feel that they are your co-workers and friends, the recipients of your kindness and love and they will not disappoint you, but will supplement your work and your effort, and like the bread sown on the waters, will send it all back to you with interest more than compounded after many days.

The CHAIR: What is your pleasure concerning this report?

On motion, the report was received and placed on file.

The Chair: The next thing in order is the report of the Sanitarian, Dr. Benjamin Lee of Philadelphia.

The SECRETARY: Dr. Lee wrote to me that he would not be here but would send his report. The report was not sent to me. If anybody else has it, we would be very glad to have it.

No response.

The CHAIR: The next thing in order is the report of the Committee on Roads and Road Laws, P. S. Fenstemaker, Chairman.

The report read by Mr. Fenstemaker is as follows:

REPORT OF COMMITTEE ON ROADS AND ROAD LAWS.

By P. S. Fenstemaker, *Chairman.*

This question of better roads is not one of recent date. From the remains of roads of ancient nations discovered, it is evident that there have been people who had considerable knowledge of the science of road-building. The statement is frequently made that the condition of the public highways of a people are a true standard by which to measure the extent of their civilization. If this were applied to our people, and especially at an early springtime, our measure would not be very great.

In England, the Saxons and those who came after them for many centuries, were not sufficiently civilized to use as models the magnificent roads left them by the Romans. History shows us that new conditions of traffic have always brought about new conditions of road-making. In 1555, the first coach was built that was ever seen in England, as was also the first road law enacted. This law, among other provisions, provided for the election of surveyors by popular vote. These were empowered to exact four days labor from every parishioner every year. It appears that from this may have originated the present system of annually electing our supervisors and the working out of road taxes.

In 1663, there was placed on the statute book, the act under which the first turnpike was established. In 1818, John Louden Macadam's system of road-making was adopted; and this, in combination with Telford's, resulted in the construction of good roads. The work of these two great pioneers of road-building must be considered together. They broke away from the traditional methods of following the old roadways, and where possible, laid out new roads over gentler ascents through deep cuttings, and clear of soft, low grounds.

Their joint system of constructing roads may be considered a reversion to the old Roman system. Telford approved of a firm foundation. Accordingly, he dug out the route and made a regular bed of rough, close-set pavement with six inches of broken stones, which was rammed hard, and over this was laid the upper crust of macadam; and to the present day a road thus constructed is at once hard, smooth and durable. There is all the difference in the world between a road which has been built as a road over a carefully selected line of country, and a road which has been fashioned out of an old road-bed.

In the hurry of the progression of our country, this question of good roads has been side-tracked by other improvements, of which were the railroads. The movement for good roads built by the Federal government had hardly begun when the steam railways became the post-carriers, and the United States government went out of the business of road making. It is only since the introduction of the

bicycle, and still later, of the motor car, that our attention has been called to the miserable condition of our roads and the inadequate laws governing them. The National Good Roads Association has enlisted the services and assistance of several important railways in a campaign of education in some of the Southern States.

A special train carries the machinery for sample road-building here and there, so the people accustomed to bad roads can see for themselves what a good road is, and what it means. They want good roads. The railways are interested in good roads because the latter act as feeders of railways. They develop the territory through which they are built and increase the productive capacity by greatly diminishing the cost of marketing crops.

It is, in the main, an economical question pertaining principally to the waste of effort in hauling over bad roads, the saving in money, time and energy in hauling over good ones, the initial cost of maintaining good and bad ones. Much as one may differ as to the method of road-building, we are undoubtedly of one mind, that the dirt road has seen its day, and that all money spent on repairing earth roads becomes each year a total loss without materially improving their condition. They are the most expensive roads that can be used.

The introduction of improved road-building machinery has enabled the authorities of some states to build improved stone and gravel roads quite cheaply. In a recent publication it is given that first-class single track stone roads, nine feet wide, have been built near Canandaigua, N. Y., for about one thousand dollars per mile. Many excellent gravel roads have been built in New Jersey for one thousand to thirteen hundred dollars per mile. The materials out of which they were constructed were placed in two layers, each being raked and thoroughly rolled, and the whole was consolidated to a thickness of eight inches. In some states macadam has been built for two to five thousand dollars per mile, varying in width from nine to twenty feet and in thickness of material from four to twelve inches.

Telford roads, fourteen feet wide and ten to twelve inches thick, have been built in New Jersey for four to six thousand dollars per mile. In a section of country where the topography is somewhat rougher than in New Jersey, necessitating the reduction of many steep grades and the building of expensive retaining walls and bridges, and also partly to the difference in method of construction and the difference in price of material and labor, the cost of such roads will be proportionately greater.

New Jersey has the reputation of building more good roads for less money per mile than any other state in the Union. Their roads cost from twenty to seventy cents per square yard—where the Telford construction is used, they sometimes cost as much as seventy-three cents per square yard.

We would refer those especially interested in road-building to the pamphlet on Roads and Road Laws of 1895 and 1903, compiled by State Highway Commissioner, Joseph W. Hunter, in which he gives many good points that are necessary to be observed in the construction and maintenance of good roads. A copy of this excellent publication should be in the hands of every supervisor of this Commonwealth.

Now, as to the personel of the average supervisor, we find in many cases that there are nominated and elected to this office men who are in need of something to do, regardless of qualification. Such supervisors usually employ a lot of people to loaf out a day's wages on the roads as long as they can spare the time from their farm work. They generally do the right thing at the wrong time. There is a lack of good judgment in both making and repairing of roads. Our present system of electing the entire board of supervisors annually is very defective in that men thus elected for only one year will not make their plans as thorough and far-reaching as if they were certain of their position for a number of years. Their plans and work will naturally be a make-shift, and besides, their successors may have ideas radically different, so that there is no incentive for them to make plans for an extensive and thorough improvement of roads. We, therefore, heartily recommend the provision in what is known as the Hamilton Road Law—to elect at least three supervisors in each township, this to be a continuing board same as school boards, one being elected each year. Their duties should be to supervise road-making, levy taxes and appoint road masters who would work under their directions. In this way a better class of men would be willing to serve and the fellow who simply wanted a job would not find enough in the office to seek it. Since the State is going into the road-making business, we may obtain some object lessons in various ways, and also learn how to exhaust a lot of red tape and public funds.

Now while we are desirous of agreeing upon some plan for the improvement of our roads, let us not loose sight of these two facts:

1. That well-built roads are costly.
2. That they will serve more than one generation.

Is not real estate at present taxed heavily enough for township and county purposes, while the meagre rate on personal and corporate property remains the same from time to time? Telegraph, telephone and pipe lines, electric and steam roads are almost exempt from local taxation. Will it not be necessary to devise some means similar to those applied in the State of New York in all districts where these corporations pass through where they are taxed for local purposes?

And still further, the Legislature of that state, at its coming sessions will be asked to make an appropriation of four million dollars for immediate improvements of highways; and again to enact a bill which will authorize a fifty million dollar bond issue for the carrying out of an extensive plan of highway construction devised by the State engineer. This program was outlined by the executive committee of the Annual Good Roads Convention, of delegates representing the various boards of supervisors of the state. This executive committee represents 350 delegates from 57 counties of the state, and its duties are to prepare recommendations for legislative enactment.

According to the last annual report of our State Highway Commissioner, there have been, under the act of 1903, one hundred and seventy-four applications from forty-six counties, aggregating 372½ miles. Nine and one quarter miles of road completed and accepted by the Department; about thirty-two and one-half miles are in process of construction, while twenty-six miles are under contract, but

work thereon has not been commenced, and about eighty-five miles in preparation for bids and advertising.

Native stone or stone along the line of the road have been used, where it was suitable, for the bottom course of either Macadam or Telford, the top course having been trap rock or hard limestone. In addition to the above, the Department during the past year has supervised the construction of over twenty-four miles in the township of Bensalem and Middleton, Bucks county. Both of these townships issued bonds to pay for these improvements.

As no mention is made in this report as to what extent the township or contractors put in bids and were awarded the work, as also the relative cost of these different roads, we are unable to give this very important information.

Now as to the issuing of bonds to pay for township road reconstruction, I doubt whether this is a wise thing to do in a purely farming section. We know of a road built on this plan through a thickly populated section of Lehigh county, known as the cement region, which was constructed to make the cement works more easy of access to those interested. This improvement was, however, not necessary, as the road is one much traveled. Yet many of the taxpayers of this township are greatly displeased since the road is constructed with this bonded indebtedness, as also of the uses made of this road by automobiles, which incommode other users of the road. This abuse has become so flagrant that the authorities have men stationed to watch and keep in check drivers of more recklessness than sense, and thus endeavor to guard the lives of both the users of the road by horse conveyance as well as those using the automobiles. These features of the question have made the people a little shy of any further reconstruction even by State aid.

The motor car has come to stay, and the situation must be faced. The automobile has no more rights on the highways than any other vehicle. Being a new and unfamiliar machine, it is for the autoist to drive so as not to frighten other users of the roads. What is complained of is simply the entire disregard of all other's rights that is displayed by many autoists. This attitude is shared by every sensible person, including the many estimable gentlemen who run motor cars as they should be operated. It may be necessary in the near future to pass more stringent laws regulating the manner of use of this mode of conveyance on the public highways.

In order to get some of the sentiments of the people on the new road law of 1903, we have sent letters of inquiry to different sections of the State, and herewith give a few of the replies received.

From a supervisor who states that there are four supervisors in his township, and that they do not take any interest in the new road law. From another, who claims that as tenant or share-farmers, as per the customary farm leases, are obliged to pay or work out the road taxes, and being, as a class, poor, they object to any change that might be likely to cause higher taxation. Another supervisor says that the amount of state aid allotted to a township is too small to make it worth while considering the matter.

A taxpayer replies that he believes that strictly agricultural communities would, in his lifetime, not derive any benefit under the new law, but that suburban districts will become the principal beneficiaries. Another, who believes that the people are gradually

seeing the value of improved roads, but that a change in the new law should be made requiring the county to pay at least twice as much as the township; and that when application for State aid is made, it would be best to have the State Highway Commissioner decide which section of road should be built, instead of the county commissioners, as at present, claiming that undue influence is often brought to persuade them to improve first such roads that are not in urgent need of same, or which are not of the principal ones as far as heavy travel is concerned, and thereby disappointing the general public.

The following reply is characteristic of the writer:

"Dear Sir: Probably the best we could do would be to repeal all road laws to date, formulate new ones, providing, among other things, for the cash payment of road taxes, secure good workmen, under competent supervisors, pay labor weekly, levy a tax on pleasure carriages $1.00, automobiles $50.00, bicycles 50 cents and traction engines $5.00 annually, as a separate road tax, and collect a fine of $5.00 from any resident of borough, town or city who complains of poor country roads.

"Respectfully yours,
"W. H. STOUT."

It is very evident from these divers views, that a campaign of education in road-building as well as of devising measures to pay for them, is of more importance than new road laws. We have laws to burn. There is much in our old and new road laws that is good. To repeal all would be a mistake. Take for instance the acts for the opening of new roads, of vacating and altering roads, for obstruction by railroad companies, taking charge of turnpikes, bridges, proceedings in road cases, provisions, penalties, etc. These have stood the test of time, and can hardly be improved. To repeal them and not substitute something equally as good, would be to create chaos. Changes will undoubtedly be necessary and can be made by amendment from time to time.

One very glaring defect in Section 10 of the act of 1903 was observed in an experience we had in endeavoring to persuade a board of supervisors to apply for State aid. Two of the supervisors were favorably inclined, but could not agree as to which particular road to begin operations on. Each favored the road passing nearest to his premises. The third member of the board could have been persuaded to favor either one of the roads selected, but as all the supervisors would not agree to sign the petition as the act requires, the project came to nought.

We would suggest, therefore, that the parts of the act of 1903, in Sections 10, 11, 12, 13 and 16 be amended where it reads: "The supervisors or commissioners of a township," be added the words "or a majority of them." In the act of 1901, to encourage the use of wide tires, in Section 1, there is a provision that every person using four-inch wide tires in hauling loads of two thousand pounds or over shall be credited by the supervisors of the district with one-fourth of the road tax assessed and levied on property of such person. Such credit shall, however, not exceed five day's labor, or its equivalent in cash. Limiting the amount of the one-fourth credit to five days labor or its equivalent, is not enough of an inducement to a person having a large amount of road taxes to pay, and naturally using

the highways more than persons whose one-fourth credit amounts to only five day's labor. We would recommend the striking out of the entire proviso relating to the limiting of this one-fourth.

In Section 2 of this same act, where a penalty of five dollars is laid on every person who shall haul loads of ten thousand pounds weight or upwards with wagons not having tires four inches wide, be amended to strike out the word ten and insert the word five. In our opinion no load of two and a half tons or over on wagons having tires less than four inches wide should be allowed to pass over any public highway.

We particularly recommend legislation prohibiting trolley companies from occupying the public highways of a township, if a location elsewhere is possible, and they should be entirely prohibited from tearing up and using any public highway that has been reconstructed with State aid.

It is the opinion of your committee that unless proper precautions are taken for the preservation of our public highways reconstructed by State aid, by the enactment of some such laws, the maintenance of such roads will in time become more burdensome to the taxpayers of the townships than was their construction.

We have annexed to this report the recommendation of State Highway Commissioner Joseph W. Hunter, which we consider favorably and worthy of consideration:

THE STATE HIGHWAY COMMISSIONER'S RECOMMENDATIONS.

1st. That all applications for road improvement be filed with the Department on or before the 31st day of May in each year and that the money apportioned to counties on the first day of June in the previous year and not applied for by said county, be apportioned to the counties that have an excess of applications for the current year. This will enable the construction of more miles of roads in the counties that have filed applications for road improvement that would require more money than their share of the annual apportionment.

2nd. That the Department be authorized to make complete measurements of the roads in all the counties of the State, so as to ascertain the correct number of miles in each county, as the returns that have been made are in many cases decidedly erroneous, the counties and townships being unwilling to bear the expense of a proper measurement of the roads. This also should be done in order that the commissioner can comply with the requirement of the act, Section 21, as to the making of a complete road map of the State.

3rd. The act should determine what should be taken as county bridges and what township bridges. In some of the counties all the bridges large and small are erected and maintained at the county's expense. In other counties all the bridges are erected by the county and maintained by the township, and in other counties all the bridges are erected and maintained by the townships. It has been a difficult matter for the Department to determine whether a bridge is one that should, by rights, be erected by the county or by the township. In most cases the county has been given the benefit of the doubt and the bridge erected as part of the reconstruction of the road.

4th. The work of making the preliminary surveys and plans should be done by the Department. Nine-tenths of all the surveys and

plans sent to the Department have to be gone over and new surveys and plans made. There is always a controversy as to who shall pay the costs of survey, and in several instances applications are held back by the county commissioners because the supervisors have not had the survey made, while the act distinctly declares that the county commissioners are to furnish to the "Department an accurate plan of the layout, lines, profile and established grade of such highway."

5th. The office force of the Department should be increased by having an additional clerk or bookkeeper, one who should also be able to operate a typewriter. At least two draftsmen, who should also be civil engineers, should be provided the Department and at least four competent civil engineers who shall have general supervision of road construction. The compensation of these men should be provided for in the act and they should be appointed by the Commissioner.

The contingent fund should be large enough to allow the employment of additional assistants, civil engineers or surveyors, when they are required.

6th. The law relating to the election of supervisors should be so altered or amended to permit of having a board of at least three supervisors in each township. This is to be a continuing board after the first election, one being elected each year. (Hamilton Bill.)

The time is ripe for making this change; it is demanded from all over the State. In some cases supervisors have made application for road improvements and those who have succeeded them in office have attempted to repudiate the action of their predecessors, causing no end of trouble and annoyance. In some instances the supervisors have refused to act after being petitioned by the owners of a majority of the assessed value of the property in the township.

The time is rapidly approaching when the work tax in road repairs in the various townships will be abolished. Of the $4,500,000 levied and collected for road purposes, one-half is practically wasted or thrown away. Under the work tax method the township pays one dollar for fifty cents worth of work.

7th. It should be made a misdemeanor with a heavy fine or imprisonment, or both, for drivers or owners of teams to maliciously or intentionally destroy roads reconstructed either by townships, county or State, or roads reconstructed jointly by State, county and township, either by the use of rough, ice or drag locks, by plowing a gutter alongside of the macadam with a heavily loaded wagon, or otherwise.

This is generally done in going down a grade. In some instances team drivers have been known to deliberately drive on the edge of the macadam and tear it up, and when their attention has been called to what they had done they have declared their intention of tearing the road to pieces if possible. Such men should be arrested on the spot and summarily dealth with.

8th. The wide tire law should be made effective. Narrow tires on heavy wagons are destructive to all roads and should be abolished as soon as possible.

Broad tired wagons help to maintain stone roads. A penalty

should be imposed on all persons hauling loads of greater weight than those specified for certain width of tires, namely:

2,000 lbs., including weight of wagon, 2½-inch tire.
4,000 lbs., including weight of wagon, 4-inch tire.
8,000 lbs., including weight of wagon, 4-inch tire.
16,000 lbs., including weight of wagon, 5-inch tire.

Most all counties that are reconstructing country roads have adopted wide tire laws with severe penalties for infraction.

9th. The law should provide some method of compelling prompt payment of their respective shares of a contract by the county and township. The county's share should be made a lien on the amount of personal property tax that is to be returned to the county by the State Treasurer, but I can see no direct method of compelling the township to pay promptly, even after they have signed an agreement to pay their share of the cost and have certified that a "cash road tax has been levied." Last proviso, Section 8.

10th. Trolley companies should not be allowed to occupy public highways if a location elsewhere is at all possible. They should be entirely prohibited from tearing up and using a public highway that has been reconstructed with State aid, and they should not be allowed to interfere with the improvement of a public highway already occupied by them, when it becomes necessary to change the grade of such highway.

11th. The State Highway Commissioner should have authority to compel supervisors to make a sworn statement as to the expenditures of the proportion of the maintenance fund which has been given them under Section 16 of the act of 1903.

12th. The time for advertising for bids by the county commissioners should be made once a week for two weeks and the Highway Commissioner be authorized at his discretion to insert the same advertisement in a daily paper published in the city of Philadelphia or Pittsburg, and in a paper devoted to engineering and contracting interests.

13th. Rural boroughs having a population of 500, or less, or where the assessed valuation does not exceed $150,000, should be entitled to have a main thoroughfare or road reconstructed in the same manner and under the same condition as townships. Provided, that an adjoining township or borough shall have reconstructed a road to the line of said borough making application. Boroughs, however, should not have a share of the maintenance fund, except for maintaining a road reconstructed by State aid.

At this point, Mr. Clark took the chair, and on motion, the report of the Committee on Roads and Road Laws was ordered received and placed on file.

The SECRETARY: There are some very important recommendations made in this report, and if these recommendations are to go from this Board to the Legislature, there should be a motion that the report be adopted as well.

MR. HERR. I move as an amendment that the report be referred to the Committee on Legislation.

The question being on the amendment, it was agreed to.

On motion, the privileges of the floor were extended to Hon. W. T. Creasy.

MR. CREASY: Mr. Chairman, the report that has just been read, I think is one of the best reports that I ever heard on this question. I have been a member of the Legislature for several sessions and have given this road question a great deal of study, and the act of 1903, it seems to me, does not meet the requirements at all. I had a talk with a number of our common pleas judges, and every one seems to be of the same opinion. There is too much red tape about it to start with. The road legislation of 1903 was, to some extent, forced on the country people against their wishes, and it has worked out just as some of the country members said it would do. It is impossible in the poorer sections of the State, when it costs from ten to fifteen hundred dollars a mile, to build a road. I want to state to you that not many miles of road have been built in many townships in this State.

The law, as it seems to me, that meets our condition better than any, is the law of the State of Massachusetts. The state takes charge of her main thoroughfares; that is the idea of our common pleas judges in this State. In the State of Massachusetts that is done; the state pays the whole bill for the construction of the road, and then after the road is built, the counties are expected to pay one-fourth. The state takes the county's bonds and holds them until the county can pay them off, covering one-fourth of the cost of the road. As it is now under our law, as hundreds of these townships are to build these roads, we would have a kind of patchwork business; and as matters now stand I do not know when we shall have a system of roads throughout the State such as we ought to have.

The conclusion that the Grange has arrived at is, that the word "township" be stricken out of the act entirely, and drop that one-sixth that the townships are expected to pay, and let the counties pay in accordance with the provisions of the law in Massachusetts. You who come from these agricultural sections, purely agricultural, know that it is impossible for these districts to make these roads as they should be made. The average price of road building in the State of New York is $7,500 a mile; in the county of Allegheny I think the average cost is $12,000 a mile. Now these roads cost money, and it is impossible for the townships to properly take care of them. Then after you have these roads built, if you allow these narrow tires to go on, they will not last fifteen years. I have seen that tried in some sections of our county, because they are bound to cut up the roads. Unless they are kept in repair all the time, new roads built will soon be as full of holes as the old roads are. It seems to me that the farmers ought to try to agree on some plan. It seems to me that to wipe out the method of road-building by townships would be a good idea, and then let each county follow its pleasure according to the public road mileage in each county, then let the State build in each county. If you can't do that every year, let the fund accumulate and do it every two years. If the county can't put up the one-sixth, which is the case with a few counties in Pennsylvania, then let the State take those bonds. That, it seems to me, would be a plan on which we can act and succeed in establishing a

general road system. In that way we can get the main roads made, and that is what we want. We can't expect to have all these little by-roads made.

I was told by the engineers in the State of New York, that it is a question of "pull." I live on a public road that will not be improved, and I am standing here to represent what I think will be for the best interests of the State regardless of my individual interests. I am willing as a taxpayer to put up my money to have the main roads of the counties improved, because they are inter-State roads. They are just as much used for commerce as the railroads are, and for that reason, I think that the State should take hold of these main traveled roads, and if the farmers of this State stand together and adopt some system like that in Massachusetts, I am satisfied that they can get it.

The great contention in this matter for the last few years was, that the object of the bill, as it was originally framed, was to allow those counties that applied first to get the money, and it was in the hands of the Road Commissioner to decide who would get the first, and the upshot of that business would be if it were a law, that many counties would not see any of that money for the next twenty years, and that is the object, as I understand, to-day. If these poor counties cannot build roads, it is to go to the richer counties; that is what I am objecting to. I believe one county in Pennsylvania is just as good as another, and for that reason should have the assistance of the State. The main thoroughfares of the State should be under State control and the State should assume the responsibility of their construction, under a method similar to the one I have stated, and the State can well afford to do it.

When you ask about the money, if you will look over the reports of the treasurer, you will find there are millions of dollars of surplus; and besides that, I have claimed, and still claim, that lots of this money that is put into the State Treasury is money that should never leave the county. For example, that additional liquor tax which was put on in 1897, and the mercantile license tax, and the personal property tax. Now the personal property tax, which amounts to over three millions of dollars, is paid into the State Treasury—three-fourths of which is returned, so there is still one-fourth left, or about $900,000. Most of that money is raised by taxing mortgages and judgments on the farms and homes which are already over-taxed. This additional tax should be used to relieve that taxation. So I say that the State can well afford to build the different main roads through the State in the different counties. It will be but a few years until we get National aid. I would not have a road law passed that has something hooked to it that if a poor fellow don't whack up, he don't get anything.

The Chair called on Dr. Detrich for some remarks.

DR. DETRICH: Mr. Chairman, I am not a member of this organization, and merely came here to have the pleasure of listening to your proceedings. I think one of your committee reports gave us some few lessons about discrimination and I noticed it was suggested that automobiles should be taxed fifty dollars each. Am I right?

MR. CLARK: Yes.

DR. DETRICH: Now as it appears to me, automobiles are beneficial and are strongly influential toward promoting good roads, and I do not think we ought to discriminate against these things. If you want the city people to be discriminated against and so set them at odds with the country people, you know how it works.

What the country needs is more capital on the farms. It will bring farms up to a higher state of cultivation, and to a larger production, and every person doing business to-day and every business man in the State is interested in the best methods that can be applied to the work of the farm. One of the most necessary things is to have rapid means of traveling from one point to another, and this facility is furnished by automobiles better than by any other means. Automobiles have wide tires and they are also made of rubber, and I do not see why this discrimination should come up against an automobile traveling on a public road. It is a cheap way to ride and a saving of horse-flesh. I am sorry that these discriminating allusions came up in reference to the road law. I know that the owners of automobiles are among our most earnest workers for good roads, and I have been surprised to find that there is a feeling against these men. The automobile has come to stay, and we may as well recognize the fact, and it appears to me that the best thing we can do is to heartily co-operate with those men for the improvement of our public roads.

MR. MARTIN: There is possibly no question that may come before the Legislature of more importance than the one now under consideration; a question which affects very directly the farmers of the State, living, quite possibly many of them, in the more remote portions and rural districts of Pennsylvania. It behooves the farmers to look well into the conditions of legislation, relative to public highways and into the law which is now in force, which looks to the construction of permanent highways. I have consulted just recently with the Road Commissioner relative to the workings of that law. It is not only his judgment, but the judgment of most of the farmers to-day in Pennsylvania, that the one provision in this act which relates to the part which the townships bear to this law in petitioning for a road through the supervisors and in the paying of one-sixth of the cost of the construction of a road, is possibly the lamest point in that law and one which causes more trouble and delay than any other portion of the act, and I am fully satisfied, as I understand the question, that we ought to take up that proposition, and through your Legislative Committee, make such recommmendations to the Legislature, now in session, as will bring about a modification of the law, such as will give us good practical work throughout the State. I would possibly go just a little further than some of the gentlemen whose remarks preceded mine, and that is, that we will possibly soon approach the time in which the State will construct these highways irrespective of the amount received from the county and the township. The main road or roads in the different counties will be, according to the number of miles in the various counties, placed in the hands of the Road Commissioner to make use of the State funds as far as they will go toward the permanent construction of these roads; and in my judgment, my friends, then, and not until then, will you arrive at a system of

road construction that will have an approach to permanency and durability.

I simply direct your attention to these questions, for, in my judgment, as long as the township has to be consulted and has to pay a part of the expense, we cannot possibly succeed in establishing a satisfactory system of permanent road construction, and what I have said corresponds very much with the judgment of the Road Commissioner on this point.

MR. FENSTEMAKER: I would say relative to taxing automobiles, that there is nothing in this report directly recommending a tax of fifty dollars.

MR. McCREARY: We in Lawrence county were fortunate enough, or unfortunate enough, I don't know yet which it is, but we will know better perhaps towards spring, after the frost comes out. We had half a mile of this new road built last summer; I believe it is the only half-mile in the county. I presume that we must have had some pull. I don't know how that is, but I think we just happened to ask for it before anybody else; I think that was the reason we got it, and we got it on a certain road. I drive over it every time I drive into New Castle. They hauled limestone to make this road, and it cost a few dollars less than $4,000 for half a mile, and we think it cost too much money. This feature of the case may rectify itself further along; of course it was new business, and there didn't seem to be any bids, hardly, for this work. The only man that bid for it got it, and he certainly got it convenient to material, and he ought to have made plenty of money. There's another thing. While it has not been in use only two or three months, three months perhaps, I noticed the last time I drove over it, that there was quite a depression where a single horse walked in the middle of the track, and you can see the depression where the wheels run, and it looks to me—of course I don't want to condemn it until after it is tried—but if we get as much freezing weather as we had last winter, it does look to me as though that it will all be cut up in holes. Perhaps there was not enough stuff put on. The finishing stuff had to be shipped, and a carload of it would go a long ways, because there was very little dusted over. I notice that there are pieces of limestone as big as eggs and larger, and when a buggy would strike them, they seemed to be kind of working up on the surface. The cost to the farmers of the township was pretty heavy; and that is not all. Our township runs in a peculiar shape; it is long and narrow. It abuts down against the city limits of New Castle, and there is another main road, a road south that is fully as much traveled as our road is, and those people over there of course have to pay just as much as we do, and they never use our road, because it don't run where we want to go. I think there is an injustice in that; these people who live down there had to pay the bulk of that money for this road and they get no benefit from it, while we are benefited, and the main half mile of our township runs pretty near to the Mercer county line; and since this piece of road is built there, it drains the whole of the northeastern part—that section of the country. There is an injustice in this which it looks to me, ought to be remedied in some way.

MR. BLYHOLDER: It seems to me if we all agree on certain points, if we want to do something, and we seem to agree that we want to eliminate this township part of our road-law in the way it exists here, that on the adoption of this recommendation—

The CHAIRMAN: There is no question before the house at all.

MR. BLYHOLDER: It seems to me there ought to be something before the house for us to take action upon, or else our good opinions and good suggestions will all go for naught. It seems to me we ought to have a definite point before us; by the adoption of this report it seems to me we have adopted—

The SECRETARY: It was not adopted, it was simply received and referred to the Committee on Legislation.

MR. BLYHOLDER: Let us then bring up a resolution stating what we want, and pass it.

MR. HERR: I move the postponement of this subject until the report of the Legislative Committee is heard.

MR. HUTCHISON: There is just one point that I wish to bring out in regard to the working of this law in the county commissioner's office. In our county they have been making, I think, five pieces of road; one of these pieces is a mile long. The county commissioners received petitions a short time ago from the farmers' organizations of our county, the grange and other organizations, toward reducing the expenditure of money in our county. We are paying a twelve-mill tax and the commissioners refused to sanction the building of these pieces of road that had been recommended by the supervisors. The Highway Commissioner came up and convinced them that they had nothing to say about this money, that it was mandatory. They were compelled to pay their share of the money. Our county is heavily in debt and the commissioners are trying to reduce that by heavy taxation.

Now is this right? Ought not these commissioners to have something to say about the expenditures of public money? Is it right for the supervisors to place these burdens on the county when these roads are of no benefit to the people living in the county except at nearby points. Our people are protesting against this, but there seems to be no remedy, and I thought that it would be proper that this law should be amended so that the county commissioners should have something to say about the expenditure of public money. I think it would be well to strike out the power in the townships. Some one should have some say besides the Highway Commissioner. That is the question that I would like to bring before you and have discussed. Our people, as a whole, are opposed to the present road system and I believe a great many people throughout Pennsylvania are opposed to it. This is an elegant report, containing many good suggestions, and Brother Creasy has given us an able address on the subject.

DR. TOWER: There has been a suggestion here that we favor the use of the automobile, or to that effect. Now, as far as I am concerned, I would be in favor, if anything, of making their tax larger.

The gentleman said that their use was a saving of horse-flesh. That is true; many a good horse is standing in the barn because of the use of the automobile, and many a farmer hesitates to drive his horses around in the road because of the danger that exists on account of the reckless use of that vehicle. I do not know, but I would be in favor of making the roads so rough that a man with an automobile could not get over it. It resolves itself right down to this. The man that rides in the automobile rides in it for pleasure, and to a certain extent we are sacrificing our right to use the highways for work in order that he may enjoy his pleasure. Now why shouldn't he pay a pretty good tax? It is said that the average automobile man will take care of the horses when he uses the highway. I have seen that myself and experienced the danger there is where the automobile is driven at the speed it often is along our public highways.

DR. DETRICH: Mr. Chairman, I am surprised that a man in this enlightened age would make such a statement on this floor. The automobile is destined to be and is now one of the most rapid and frequently used ways of traveling from one point to another and is one of the cheapest modes of conveyance of anything that I know of. Like the steam and the electric railway, the automobile is with us to remain, and how any one can doubt its utility and its convenience for traveling from point to point is something incomprehensible to my mind.

MR. STOUT: I did not make this suggestion to tax those people any higher than anybody else; but an automobile, as I understand it at the present time, costs about as much as a fairly good farm in my community, and I know that the same amount of money invested in some of our farms must at least be closely approached by some of them. Now if we were to tax the automobile, dollar for dollar as our farms are taxed, it seems to me that it would not be an injustice to those who can afford to own them. They have some privileges additional to those possessed by the farmer, and why should they not pay a little additional tax.

MR. SEXTON: Great reforms move slowly and it takes a great while to educate the people up to the point where they are prepared to support a movement of this kind. We have had in Pennsylvania the worst public road system of the United States for hundreds of years; we all know that. We have been hauling mud from the gutters into the highways in the same old way year after year for the frosts, rains and snows of winter to act upon and take it back into the gutter again. Now we have been agitating the road question in this Commonwealth that is nearly an empire, and so far we have succeeded very well. This road question is taking shape and we are getting there, so to speak. In the session of '97 when the Hamilton road law was before the House, my friend Creasy was opposed to it. It didn't go far enough, but it was the entering wedge to bring about such discussion as we have had since that time.

Now my friend Creasy says that this present law is not good enough, but we are going to have something better. If you keep talking this up among yourselves, we are going to get there, and

get down to a system of public road building that will be for the good of all the people. I like the bill that was presented, I think, in 1901, to lay a tax of one mill upon all personal property and set aside a public road fund that would amount to millions of dollars a year and so placed that it could not be used for any other purpose. It was said in the past that if you wanted road legislation, if you had a political pull, you might get it; if not, you would not get it, but to-day we are getting State aid, although ten years ago we were told we could not get it at all. We have got it, and we are going to have aid from the general government. It is coming just as surely as the sun shines, and we are entitled to it, and if the farmers of this country who use the public roads and to whom the public roads belong—at least the people in the towns and cities have said so—now they are coming to believe that they are part owners of the public roads. The general government is going to give us substantial aid, and I tell you, fellow-farmers, we only need to keep fighting on this line, and we will get the best road system yet that there is in the United States, though we may be the last to get it.

MR. HERR: I suppose we all have our ideas about the value of good roads and how to make them; but until we have some mode of action brought before us, I think it is perhaps a waste of time for each individual to give his particular opinion as to how the roads should be made. I think it would be wise to defer the further discussion of the question until we hear from the Legislative Committee so that our work will take some definite shape; therefore, I move the discontinuance of this question, until we hear the report of the Legislative Committee.

SECRETARY CRITCHFIELD: I second the motion.

The question being on the motion, it was agreed to.

MR. HERR: I think that the Memorial Committee have their report ready.

The report of the Memorial Committee was presented and read by Mr. McClellan, the Chairman, as follows:

Whereas, We have learned with regret of the death, on Jan. 22, 1905, of Geo. G. Henry, Esq., ex-member of this Board, from Clarion county; therefore, be it

Resolved, That we remember with pleasure the associations with Mr. Henry in the meetings of the Board and recognize the valuable services rendered by him in the management of Farmers' Institutes in his county;

Resolved, That in the death of Mr. Henry the State has lost one of its best citizens, the agriculturists an upright, fearless champion of their cause, and this Board one of its strongest friends;

Resolved, That a copy of these resolutions be forwarded to the family of the deceased, and that they be spread upon the minutes of this Board.

S. X. McCLELLAN,
J. A. HERR,
C. B. HEGE.

MR. HERR: I move the adoption of the resolutions as read. The motion being seconded, it was agreed to.

Vice President Sexton resumed the chair.

MR. HERR: I think the older members of the Board will remember "Squire" Henry, as he was known everywhere in the State, as being an active, progressive member of this Board; and long before he was a member of this body, when Mr. Shanafelt was a member of the Board in his county, he had sufficient interest to accompany him and attend our meetings, and was one of the most active workers that I know of in our country. More than once I have traversed the county with him in the holding of farmers' institutes. He was a man of unswerving integrity, commanding the respect of every body who knew him, and an earnest champion of our cause everywhere; therefore, these resolutions are well merited, and we concur in the report.

The SECRETARY: I wish to emphasize what has been said by Brother Herr about our deceased brother and friend. It was my pleasure to travel with him years ago. I doubt whether I have ever seen any one who manifested a deeper interest in his work than did Mr. Henry. He was not only recognized as being an earnest advocate of better methods on the farm, better farming, but recognized as a man who was thoroughly honest in his convictions, a man who was ready to give expression to his views in such a way that he should not be misunderstood, and I think that anybody who had his disapproval had no trouble to know that he disapproved the course pursued. I think that this Board, not only in Clarion county, but over the Commonwealth generally, sustained a loss in his death, and I am heartily in sympathy with the resolutions that have been offered by the committee.

MR. STOUT: I wish to ask whether that is the only resolution that has been offered by the committee.

The CHAIR: In this case, yes.

MR. STOUT: I want to call the attention of the Board to the fact that one of our best friends—I think he was a member of the Board in the past—president ex-officio—Ex-Governor Pattison, who was one of the best friends we had, is also deceased. I think it would be appropriate for the same committee to bring in a resolution in regard to his death. Therefore, I move that the Committee be instructed to also make a report on Ex-Governor Pattison.

Several members seconded the motion.

The CHAIR: The resolution is now before the Board.

The question being put, it was agreed to by a rising vote.

MR. HERR: I am very glad that our friend Stout brought to our notice this omission, and I would suggest that the same committee be appointed to take into consideration the death of Governor

Pattison. I will offer it as a motion. The motion being seconded, it was agreed to.

The CHAIR: I will appoint Brother Herr, Brother Stout and Brother Rodgers as that committee.

MR. HERR: I have another matter to present to the Board, if I am in order. In the early days of the Board, you will notice by reading the law, that one-third of the members' terms expired each year, and they were succeeded by members whose terms were three years, and it was the practice in those days that they were divided among the three divisions, each one holding office three years, so that about an equal number of the terms expired in each year. We have grown now, and have come in so irregularly, that the terms are not at all equal, and I have just taken a little pains to look over the list of those whose terms expired, and find that of those whose terms expire in 1895, there are eleven members, in 1906 twenty-one members, and those whose terms expire in 1907 twenty-one members There are eight members whose terms have expired 1904 and two members whose terms expired in 1903, and there are three blanks that the year is not given. Now, in order to properly remedy that, and possibly it had better be in the form of a motion, I would suggest that those counties not filled by membership dating from 1903 be added to the eleven, it will just make the terms each year about balance, and there will be about twenty-one in each year, or perhaps not more than twenty-two of any one year, by making their terms run to 1908; I therefore move you that they be admitted for three years from 1905, their terms to expire in 1908.

Motion seconded.

MR. HUTCHISON: Mr. Chairman, these gentlemen who become members of this Board are elected by the agricultural societies and they come here on a certificate, duly certified by the proper officers of each society, giving the date of the election when they enter the Board. Now what have we to do with it? The authority for their election comes from the societies. If they have neglected their duty, how can we elect them here for a longer or shorter term than is provided by law? I think this motion is out of order. I think we have no right to act upon this at all; the law provides who shall be members of the State Board of Agriculture.

MR. HERR: Mr. Chairman, I think this Board governs its own membership; more than once we have decided on similar questions. The county societies send their representatives here and we elect them as members, and we fix the date three years from their former term, and when there is an inequality, the Board has the power to correct that inequality; it will give them three years from this date. I did not suggest, nobody proposes to suggest, that we elect members that are not sent here from their proper societies as representatives.

MR. HUTCHISON: I would just ask the Secretary to read that section of the act, and let us then be guided by the law.

MR. NELSON: I would like to have that question settled once

for all, for it took me two years to get into this Board, after I was legally elected. This is my second term as a member from our county, and Brother Herr had charge of the Committee on Credentials. It was two years before I had a legal standing in this Board, and we could not find out when my term of office expired, and I would like to have it settled finally who does elect the members of this Board.

The SECRETARY: In response to Mr. Hutchison's request, I will read the section referred to. It reads as follows:

"Section 1. Be it enacted, etc., That the Governor of the Commonwealth, the Secretary of Internal Affairs, the Superintendent of Public Instruction, the Auditor General, the President of the Pennsylvania State College, and one person appointed from or by each agricultural society in the State, entitled under existing laws to receive an annual bounty from the county, and three other persons appointed by the Governor, with the consent of the Senate, shall constitute the State Board of Agriculture.

"Section 2. One-third of the members appointed shall retire from office on the fourth Wednesday in January in each year, according to the several appointments. The vacancies thus occurring shall be filled in the same manner as above provided, and the persons thus appointed shall hold their office for three years from the expiration of the former term. Other vacancies may be filled in the same manner, for the remainder of the vacant term."

MR. GLOVER: I have been a member of this Board for six years, I believe. In that time I have been elected three times. I have received no notice that my term has expired. I have been elected three times in the last seven years, and find my term expires in 1907.

The SECRETARY: Your first election doubtless was to fill a vacancy on the Board.

MR. GLOVER: I was elected to fill a vacancy, but was not admitted.

MR. HUTCHISON: I would like to have the Secretary's interpretation in the matter. What is your interpretation?

The SECRETARY: The Chairman really should rule on that point. The law shows that the members are elected from the several county societies as therein provided. The same authority, as I understand it, has the right under the law, to fix the term for which they are elected.

MR. HERR: In the early days of the Board, as the Secretary knows full well, that matter was decided just in that way. I came here in connection with three others, two or three others, when I was admitted to membership by the Board, and my term read three years. I was given a two-year term, and another, one year, and another, two years because it was divided by the Board itself. I can't agree with the Secretary that the Board has not the power to elect its members; I do not see any other way to correct these inequalities except by a vote of the Board.

MR. HUTCHISON: A vote of the Board would not be legal. It would be changing the act of Assembly which created it, and that you can't do at all.

The CHAIR: I shall have to decide that Brother Hutchison's point is well taken; that we cannot change the election, as it comes up from the agricultural societies entitled to be represented.

The SECRETARY: Before the Chair renders any decision, I would like to ask Mr. Herr whether he knows how this matter has come about; how it happens. Has it happened by vacancies caused by death or resignation being filled by parties elected for three years instead of being filled for the balance of the term? If everything had gone on as it ought to have gone on, this state of affairs would not exist. Mr. Herr's suggestion to get this matter straightened seems to me impossible. I wish it could be done, but I am of the opinion that the act of Assembly puts the election upon the societies of the several counties and that all we have to do with it is to recognize the persons so elected, as members, when we admit them to the Board.

MR. HERR: If you will turn to Elk county, you will find that their term expired in 1903. As it is now it would expire in 1908. Dauphin county is not represented now. Some others expiring in 1904 are not represented. They came in with credentials for three years because the blank form says three years. I think that section admits that, that one-third shall come in each year, if not an appointment by the Governor; it is an appointment by the different agricultural societies and the Board always has in the past fixed the term of service so as to equalize these three sections, and I know of several instances where matters were settled in that way.

MR. HUTCHISON: I remember very well that the Secretary took a great deal of pains in keeping the record straight. Where there would be a death he would notify the agricultural society of that fact; that is where this should be kept straight. It seems somehow they have elected for a longer term than they should have done. I think this will right itself, twenty-one expiring this year and twenty-one the next year; it may come all right in time.

The SECRETARY: You will remember that I gave an opinion upon it. I am disposed to think with Brother Herr that it is entirely competent, if there has been a mistake made in the term by the society that makes the election for the Board to make the correction. I am disposed to think that the Board has the authority to do that; to make the correction as to dates in the returns that are made by the agricultural societies.

MR. BLYHOLDER: I just want to call attention to one matter that I think makes that clear. I think the law defines that one-third shall retire each year, before it specifies the term of election, so that when it does that first, it seems to me to be important for the Board to know in order to carry that out.

MR. RODGERS: In addition to that, if you will count carefully over this list, twenty-one will expire in 1906 and twenty-one in 1907,

and I think there are twenty-two of the others, and if they come in with their credentials at this meeting, of course they will expire in 1908, and that will be all right. The reason, I would say—and I expect the Secretary will bear me out—that these different counties have failed to elect members to the State Board, or probably some of these agricultural societies may have died, and there is no organization there to elect members to the State Board, but if we just leave it alone, it will work itself out even without any further trouble or discussion about it.

MR. FENSTEMAKER: I was elected to fill an unexpired term, although I didn't know when the term of my predecessor expired. I think last year I was on the list expiring in 1906; it is 1907 now; I can't tell just the proper date. If my predecessor's term did not expire until two years after, it would expire this year, so that I do not know where I stand on that matter; probably Mr. Herr would know better than I do.

The question being on the motion, it was agreed to.

The CHAIR: The next thing we have on the program, is a discussion opened by Mr. Clark, of Westmoreland, on the subject of "Marketing Farm Products."

Mr. Clark's address is as follows;

MARKETING FARM PRODUCTS.

By M. N. CLARK, *Claridge, Pa.*

Mr. Chairman, Ladies and Gentlemen: It seems to me that one of the most important subjects has been left in the back-ground. We have been talking for many days, weeks, months and years about the growing of our crops, and there has been very little said about the marketing of them; yet you will realize at once it is a very difficult matter of raising the crops. The two questions are so closely allied.

You will realize with me, you have met cases of this kind very frequently, that men are seemingly scientific farmers, and good crop producers, but utter failures when it comes to the marketing of crops. I do not need to go far from my home, and I presume you don't, to find that that is the case.

I was first led to notice this matter more fully few years ago in a trip I made up through the Northwest. I went through the State of Indiana at a time when the farmers were very much

agitated over the fact that they were making an effort to control the sale of the products of their farms, and while I could not endorse many things that I heard up there, it caused me to think very carefully, and last season—the last two seasons—I have spent from six to eight weeks in that State in the fruit business, and I have been really glad to find that the farmers where I have been are looking the matter very fairly in the face over there, and while, as I said, I could not endorse all that I heard, I do not suppose there are very many of the Board present who could endorse everything they are doing over there, but it looked to me as though it would be an incentive to us to turn our attention to the fact of marketing our products in such a way that it would not be necessary for us, and we would not be driven to the necessity of organizing for the purpose of controlling the sale of our products on the farms.

I visited the markets in studying this question, not only in our own but other states, and I want to say this, that in very few instances, I found on over-production of articles grown upon our farms. I did not find in a single market an article that was brought into the market in good condition, well marketed, but what there was a demand for it and they wanted more of it. This being the case, I began to look around me, at my own way of marketing, and that of others.

I want to say here, just to digress a moment, that I listened to a paper that Brother Creasy read a few evenings ago in this hall in reference to the question of quality. I was talking a few days ago to the superintendent of one of the steel plants of my county. He said it was a day of production and it was not a day of quality. I was talking to one of the superintendents of one of our great bituminous coal plants in Western Pennsylvania, and he said it was an age of production and not an age of quality. If we look around us, it seems to be more of an age of production than quality; for this reason it seems to me that it is time for us to stop and think what we are doing. If we can overcome this, and make an effort to produce quality and not quantity, I think, my friends, we shall have no need to organize in a state like Pennsylvania to control the marketing of our products.

I remember very well when it was my business on my father's farm to grow wheat. We had a great wheat farm; it seemed to be peculiarly adapted to it. My father, I believe, was one of the most careful men I ever came across. He would not have anything done but what was done right on the farm, and we had always a good article and the question was, how shall we put this into the market and get the most revenue from it? The wheat never went into the market as it came from the machines; it was always cleaned thoroughly. If there was any inferior grain in the wheat, it was always separated from it. We didn't do as we are doing to-day, go to market, and say, "How much will you give us for wheat to-day?" We didn't need to do that. They came and asked us when we would be ready to haul our wheat to market. They wanted it because it was a good article. We never had a particle of trouble in getting this wheat into the market, and it was because of that one thing that placed us in this condition—we had put this article in the market in a proper condition.

I was in the city of Louisville this last season during the time the great peach crop was coming into market, and I went where the commission men were buying and selling. The sole complaint was this: "If you will not produce better fruit and bring it into market in better condition we must go some place else to get our fruit." I realized this at once. I couldn't find a bushel on the streets of Louisville—and there were thousands and thousands of bushels of peaches there,—I couldn't find a bushel of first-class peaches.

Then we found men again who, when they found this to be the case, went to work and hired men who knew how to pick the fruit off the tree, knew how to select it and how to prepare it for the market, and they could ship it into the Chicago market and get first-class prices for it. Why? Simply because they knew how to prepare and get their fruit into the market.

Suppose for instance, an apple grower would come to me in the city of Pittsburg on Liberty street, where thousand of bushels of apples are received every week, thousands of the most beautiful apples on the top of the barrel, and suppose the question is asked, "How much do you want a barrel for them?" So much. "Will you guarantee them just as good in the middle of the barrel as on top?" "No, I can't do it. You will find just as good apples in the bottom of the barrel, but not in the center." Now why can't we put just as good apples all through that barrel, then take our stamp and put it on each barrel.

What would you think if you went into the market to buy a barrel of sugar, to find a common, inferior article in the center of the barrel? Suppose when I went into the market with a basket of butter, and had first-class butter put up most beautifully on the top of the basket, and it was sold out in the market and we found that some older butter was kept back and—perhaps in the bottom of the basket—the buyer would soon find out where it came from. Why not let every basket of goods that we take into the market be in such good condition that we can affix our name to it, then our goods will be readily sold.

Never was there a time when good articles are sought for as they are to-day. The people have the money to buy them, and they will buy them. The only question is, Why can't we put the right kind of an article into the market?

I only want to cite one more case near home. My brother has a very fine peach orchard and takes great delight in it, digging around the trees and looking after them, and trimming them off every day, spraying them, and taking care of them. Some years ago I was on his place and he had a most magnificent crop of peaches. He said to me one day: "I can't sell my peaches. I can't market them; they are selling peaches here for a dollar a bushel." I had had some experience; I learned this over in Ohio. I said: "I'll tell you what I will do; I will make you a proposition. Make the price of your peaches higher than any other peaches sold in the community. Do not put a blemished peach in one of your baskets. If you will do this, every peach you can't sell, I will agree to take off your hands." My friends, I didn't get a single peach. There was at once a demand for them and has been every year since. The talk is to-day, "Does your brother have any peaches? Will he have any peaches? I

want to get them." Why? Because he went into market with his peaches put up in good condition, and the people wanted them. He could have sold thousands of bushels of peaches for $1.50 just as readily as $1.25. Men were driving in after him to market trying to sell their fruit for a dollar a bushel, and they couldn't sell it because it was not good; not properly put up for market. It seems to me this is our own fault. We are too liable to market our products without that due care that we should exercise. If we have anything left, let us say, "Here is some that is not good." Do it honestly, and if we do this it seems to me that there is no necessity at all for us ever to think about organizing with reference to what we grow on our farms. I believe the day is coming when you will have to do that. It seems to me that the band wagon is almost passing; there will be a few people who never get into anything, who will still go to the store and ask, "How much are you paying to-day?" The store-keeper weighs it and figures up the amount, so much sugar costs so much, so much coffee, so much. He fixes the prices; you have nothing to do with it at all. Don't it make you feel mean? You have no part in this at all. Now it is your own fault. You let it be fixed. Let it be advertised and let the people know that you do not go into the market with anything but good, honest articles, and I will guarantee that you don't need to do these things very long.

MR. KAHLER: Mr. Chairman, I do not want to take up the time of this Board, but I would like to endorse heartily what Brother Clark has said. We should think of quality and not quantity. Inferior goods go begging for a customer, while a perfect article will always find a ready market.

MR. McCLELLAN: We have the Hon. Mr. Witherspoon here, Representative from Franklin county, and I move you that he be admitted to the privileges of this floor during the meeting of this Board.

Motion was seconded and agreed to.

MR. WITHERSPOON: Mr. Chairman, Members of the Board of Agriculture, Ladies and Gentlemen: I wish to say that the reason I am here is that the Legislature is not in session, and this afternoon I met some of my constituents in the city and they invited me to come to this meeting, and I am very glad that I came. I thank you very kindly for your recognition.

MR. BLYHOLDER: I want to endorse heartily what Brother Clark has said, that there is perhaps more in the way we market our products than we think. I just want to give a little experience of my own. A few years ago I commenced to study the matter of growing small fruits, what would pay me best on my farm, and I began to think back for a good many years and I found, by careful consideration, that grapes and cherries had failed on my farm, but once, in all my recollection. Naturally, I turned in that direction, and planted quite a number of grapes, and they began to get ready for market. During the same time I studied how to market them. I had several good crops of grapes, and I want to say to you to-day that

I can sell my grapes for more than twice as much per pound right at home than my neighbors are selling theirs and taking them to market, and it is simply because of the way I have been marketing them.

MR. CONARD: Mr. Chairman, I also endorse Brother Clark's ideas as to marketing our farm products. What he says, not only applies to peaches, but to all other farm products. The man who goes into the market with a first-class crop of peaches, properly prepared for market, easily gets a quarter of a dollar more than his neighbor who has failed to properly prepare his products for market; so it is with potatoes and applies to anything, in fact. We will consider the dairy business for a minute; the selling of milk. That is where the thing cuts the greatest figure, in the line of agriculture, of anything that I can think of. The man who goes to market with his milk in first-class condition always commands the highest price, while the man who comes along with his milk befouled, impure and unclean, does not only get a less price himself, but hurts the market for others.

That is true of the dairy business, particularly if you wish to sell milk to the creameries. Where a shipper sends it to the cities, and gets it there early, it is possible for him to get a little better price for it; but even then the price is held down by the milk that is not well prepared and marketed.

MR. NELSON: Line upon line and precept upon precept, is what we need on the subject. Brother Clark spoke of producing an extra good article, and that brought to my mind what first started me on that line. About fifteen years ago Mr. Root told a story that happened at Medina, Ohio, that did me more good than anything that I ever heard in my life. A farmer and his wife drove into market with a couple of barrels of gooseberries, and they went around asking the storekeepers what they would give for them, but could not get a satisfactory offer. After making the rounds, they started home with their gooseberries and met Mr. Root, who was running a truck wagon, selling produce that he was raising in his own garden, which was known to be good. The woman said to Mr. Root, "We have been trying to sell these gooseberries but could not." Mr. Root looked at them and offered her eight cents a quart and she was very glad to take that. He turned around and went among his customers and sold them for fifteen, and he couldn't find gooseberries enough for that market. I tell you it is all in the man behind the gun. When I take honey to market in bottles and jars and go to the grocers, I never let them set the price on it. I tell them, I will give you so much on the dollar, if that is satisfactory. If you don't wish to accept that, you do not need to handle the goods; what you don't sell I will take it off your hands. That is the question of marketing in a nutshell. First, you must have a good thing, and then know how to sell it.

MR. McCLELLAN: This is a question that relates to more than what you take to market, that you will attempt to realize the dollar out of. The production of the farm from three-fifths to two-thirds of it ordinarily, is marketed right on the farm. Now what

kind of a customer are you? What is your practice in dealing with your hay, grain and other products of your farm? Do you feed it in such a way that it is not worth as much in the spring as it is in the fall? I know of people who feed their products into a lot of scrub stock, and when they have the stock fed up in the spring they are not worth as much as they were in the fall. I think there is a great mistake made there. I could talk along that line, but do not want to take up your time. I just want to draw your attention to it as one of the things which every farmer should carefully consider.

MR. RODGERS: I can endorse everything that Mr. Clark has said. As an illustration, I will refer to the marketing of clover seed. I know that where good clover seed has been properly placed on the market it has brought as high as eleven cents or eleven and a quarter a pound, while the man who went to market and didn't have good seed, got but seven cents a pound. You see the difference; four cents a pound in that seed, which made a difference of $2.40 per bushel, which shows that it is the man behind the business that counts in these matters. To succeed, I think, a man must be honest; he must have honesty in his heart, and try to treat everybody as he wishes to be treated. Remember the Golden Rule and then you will come out all right, and have your seed and fruit and butter and all the other products which you take to market bought at the highest prices. Do not represent anything to be good that you would not want to buy yourself. Treat others as you would treat yourself and the market business will work out its own salvation.

MR. HOLMAN: The marketing business is such that every man must suffer his own punishment; we must suffer the punishment ourselves. I remember a case where a man had nine or ten bags of clover seed, and he took it to the warehouseman for sale. He had but one bag cleaned. The warehouseman tested every bag and found but one bag properly cleaned. That was the only one that the man volunteered to let him examine, but he examined them all anyway with the result that might have been expected. Another man brought in a sample of his seed and the warehouseman said, "If you will make that seed clean, I will give you so much." The farmer put it in the mill in such a way that not very much dirt came out of it. It was too dirty. It was not clean, and he couldn't pay him so much money for it as he wanted. He took it to the second man, and succeeded in putting it on him for more money. I am glad to say that everyone of us who takes this course and puts this poor stuff on the market, must suffer the penalty. I clean my seed perfectly. I have got a second and a third grade. If I had to buy it, I wouldn't sow it. Of course I want the best, and I thought possibly the warehouseman would not allow me much for it, but I sent a sample in and he said, "I will give you ten cents a pound for your second grade."

The SECRETARY: A very amusing thing occurred a year ago last summer, in the month of August, when we were threshing at our place. The threshers said they wanted to get some of the wheat

for seed. I said to them, "You can have all you want." Another neighbor said, "I would like to get some of the seed;" and still another neighbor said, "I want to get some of your seed," and he was looking at the wheat with interest and said, "Where did you get this wheat?" I said, "I got it from you." He said, "I never raised that kind of wheat." I said, "I got the seed from you about four or five years ago;" and it was true. I went there and got my seed. Every grain not true to variety was taken out, and we raised seed enough for the next year's seeding. He said, "I never had that kind of wheat;" every grain was full and plump, simply because care was taken with the seed. Things of that kind will occur. We do quite a good deal of farm dairying at our place. We always put the price upon our butter, and have no trouble to sell it at all; in fact, we have never been able to manufacture quite enough to meet the demand. We are very careful in putting it up. Every little package is put by itself, about the same size and same form and every one done up in dairy paper, and we have no trouble in selling it at the price we ask for it.

MR. CLARK: May I just add one word. I hope that enough has been said here this afternoon to cause us to think, and enable us to become better farmers. There is one point that I would like to speak about and that is this: It is very much a business question this thing of marketing the products of our farms; it requires education. I want to speak of the boys and girls. I am a great friend of boys and girls. I want them to know far more than I do. The boys and girls ought to have the opportunity of marketing something off the farm. Let them take it to the market, after growing it themselves; let them place it upon the market, and when they come to farm for themselves, they won't have to begin in ignorance, after they are twenty-one years of age, where we had to begin when we were boys. Let them turn their attention to marketing the crops, let them do it themselves; let them be educated to it. Then I think the only thing left for us to do is to settle down and be honest men and women and we will have accomplished it all.

MR. FENSTEMAKER: No matter what care an honest man will take, I find these creamerymen are dishonest, as a rule. I have seen stacks of empty tubs pretty near as high as the creamery, and stuff that they import from New York or some other state, they throw right into the cream and churn it as one part of the creamery butter, and sell it for that.

A Member: Where do they do that?

MR. FENSTEMAKER: I can mention half a dozen places right in my own county.

MR. HUTCHISON: I do not want to take any issue with Brother Fenstemaker. It must be a renovated butter factory that he refers to, and not a creamery.

MR. FENSTEMAKER: I am certain that I can bring witnesses by the hundred to prove it, and I have seen it done many a time myself.

The SECRETARY: I want to rise in defense of Brother Fenstemaker. I have never seen it done at a creamery and I have never seen it done anywhere; but I have heard farmers say they have taken butter, a little rancid and strong, and put it in with the fresh butter and churned it, and it would take the flavor of fresh butter. Others say they churned it in the buttermilk, and in that way are able to sell the bad butter.

MR. HUTCHISON: That would be a violation of the Pure Food Law.

A Member: I do not see how they could improve that butter much without melting it up and renovating it. The only instance I know of, was a man who had some butter that spoiled on his hands and he came to us and wanted to know if we could do anything with it. We told him he could send up half a dozen tubs and we would see what we could do. We took the butter and put it in a fresh churning of buttermilk and churned it for a long time, and worked it and churned it again, and worked with it for several hours, and in the end we could not see that that butter had improved much in flavor; but we knew one thing, that it nearly spoiled our churn, and it took several days to disinfect it.

The SECRETARY: The trouble with that comes from there having been so much rancidity in the butter. If the butter had not been quite so rancid, you could have discovered that it was improved considerably by going through that process.

On motion, the meeting adjourned to 7.30 o'clock this evening.

Tuesday Evening, January 24, 1905.

The meeting was called to order by Mr. Clark, Chairman.

The CHAIR: The first thing in order is the report of the Microscopist and Hygienist, Dr. George G. Groff, Lewisburg, Pa.

Dr. Groff read the following report:

REPORT OF MICROSCOPIST AND HYGIENIST.

By Dr. Geo. G. Groff, *Lewisburg, Pa.*

During the past year contagious and infectious diseases seem to have been peculiarly prevalent in most parts of the State. One of the most serious of these is typhoid fever, which has been called a disease peculiarly belonging to the farm, though this is no longer

strictly true, as it also prevails in villages and towns. It is a filth disease, in that it is propagated, or made possible by or through the use of articles of food and drink, contaminated with the waste from human bodies. For this reason, typhoid fever is a disgrace to our civilization.

Typhoid fever is dangerous to the occupants of any farm where it exists, to all who visit the farm, especially in attending funerals of the disease, and it is dangerous to those who purchase the products of any infected farm.

Recently a ministerial friend called our attention to the family of a rural parishioner, in whose family had occurred seven cases of typhoid fever, extending over a period of six months. What a long-drawn out time of misery and worry and suffering, and from a cause which ought to be preventable! Once this disease is in a family, it spreads from member to member through contaminated food and drink, and from hand to mouth, that is from the hand of the nurse to the mouths of the other inmates of the family. The only nurse is often the wife and mother, who is, at the same time, the general housewife and cook. How easily in her overworked and distracted state of mind to forget her hands and through them to convey the poison from the body of the patient to the food she prepares. The nurse should always ask the physician to give her a solution in which she may sterilize her hands every time after she has handled the patient. At an encampment of the National Guard of Pennsylvania, a few years ago, a helper to the cook infected the food of a company, producing over forty cases of fever.

Typhoid fever may be conveyed from the patient to food by the house-fly. The sick room should be screened. The germs may reach the well. This is often situated too near the privy, and is often contaminated with the excreta from the patient. Their excreta should not be thrown into the privy or upon the soil, but into a pit in the garden, and covered with earth; or better still, sterilized in the bed-pan before being placed in the privy. The doctor will explain how to do this. Again, wells should be so walled and curbed that the water without cannot be contaminated by surface drainage, nor by insects and small animals.

Typhoid fever is certainly a disease which can be spread at funerals, to those in attendance. This is probably accomplished in eating a meal or in drinking from the well at an infected house. It would be a good rule to chain the pump-handle at funerals for typhoid fever, and not to eat at such houses. It is also possible that the disease may be conveyed by shaking hands with and kissing the inmates of the afflicted house.

There is danger to those who purchase the products from infected farms. Investigations made by the State Board of Health have repeatedly traced typhoid fever to milk from infected farms. This has recently been done at Carbondale and West Chester. In the case of the latter place, a remarkable statement was made and signed by six of the leading physicians of the town in which the following expression occurs: "We would look with suspicion upon the products of any farm through which the drainage of West Chester flows."

The sewage of hundreds of towns in Pennsylvania flows through

dairy farms. The cows stand in the filthy streams, their udders and then their is infected and the disease is spread whereever the milk is sold. Milk is infected also by sick people employed as milkers and about the cows. No person who has typhoid fever or any other fever, or any eruptive disease, nor consumption, diphtheria, scarlet fever, measles, or any other contagious disease ought to milk or work among milking cows.

The attention of the Board is called to a bill recently introduced into the Legislature, entitled, An act for the preservation of the purity of the waters of the State. In reality, it appears to be an act to legalize the pollution of the waters of the State, for in the third section of the act, existing sewer systems seem to be legalized. At present the common law exists as a barrier against sewage pollution. This act would seem to legalize it. It is suggested that it be referred to your Legislative Committee.

Your attention is also called to Senate Bill No. 685 of the last Legislature, which calls for a survey of the streams of the State, in order that the amount of sewage pollution, now existing, may be made known to the Governor, the Legislature and the people of the State. This bill has been endorsed by the State Grange, and it is suggested that it be also considered by your Legislative Committee.

The CHAIR: What is the pleasure of the body with reference to this report?

On motion, the report was received and filed.

MR. STOUT: Mr. Chairman, would it not be more proper to place that report, if we wish to have any action taken upon it, in the hands of the Legislative Committee? I move you that it be referred to the Legislative Committee.

The motion being seconded, it was agreed to.

On motion, the Hon. Allen Haines, the Hon. Daniel Blair and Dr. Walker were accorded the privileges of the floor.

The CHAIR: I understand the motion to include all the members of the Senate and House who may be present with us.

The next subject on the program for this evening is the report of the Entomologist, by Prof. Franklin Menges.

Prof. Menges read his report as follows:

REPORT OF THE ENTOMOLOGIST.

BY PROF. FRANKLIN MENGES, *York, Pa.*

The fact that I did not know that I had been honored by being elected Entomologist of the State Board of Agriculture until several weeks ago when the Secretary of the Board notified me that I

was expected to make a report of my year's work, makes it well nigh impossible to give a report such as the Board might desire; and not being a professional entomologist, but rather an amateur in the business, makes it doubly difficult to do the matter justice. Insect life had a comparatively unimpeded existence in Pennsylvania, with your entomologist out of the State from early spring until way in December, and with the definite knowledge that he did not know of his election, and was only an amateur; and the only thing the entomologist can do is to report some of their pranks to this Board for its consideration.

The insects of our fruits seemed to be about as numerous as at anytime. The American tent caterpillar has made great headway and has well-nigh covered the State, according to the best information we can obtain. That this is one of the most destructive caterpillars, we have need not be gainsaid and then, too, at a time when the tree is just merging from its long winter sleep and needs all its foliage to set the fruit and begin its summer work. The reason for the enormous increase in this caterpillar seems to be the absence in our orchards of the species of birds, namely, the black and yellow-billed cuckoo and the Baltimore oriole, which feed on it. It is, however, easily controlled by spraying, and all orchardists should certainly destroy it by this means.

The fall weevil worm which was so numerous in the southern and eastern part of the State, and which, in 1901, destroyed an entire crop of apples and reduced the vitality of the trees so much that in many counties the crop of 1902 was inferior in quantity and quality, seems to have well-nigh disappeared from that part of the State, due to an enemy which we do not understand sufficiently to describe.

The Tussock moth has also largely disappeared from this part of the State, evidently due to the same cause. The codling moth again committed its usual depredations among the farmers; whereas, among the fruit growers it has been held in check, so far as we could learn. Therefore, if the ordinary apple grower could be induced to spray, if it were only for this moth, it would soon yield to this treatment and would no longer be the destructive pest it has hitherto been. Some of the apple growers thought the moth was not so plentiful this year as in previous years, and attribute this to the extremely cold weather we had last winter. One of the best preventive measures is to have a flock of wood-peckers in the orchards.

During our tour of farmers' institute work in the western counties, we especially noticed the large apple crop not yet harvested, the ground being covered with apples and some still hanging on the trees; and when we inquired why it was, were told that there was no market for these apples and that farmers simply let them remain in the orchards; whereas, at Pittsburg, apples no better in quality, sold for 40 cents per peck. The quality is poor and, therefore, no sale; whereas, a good quality always finds a market. This was demonstrated at St. Louis this fall where the states were showing the very choicest fruits, and Oregon carried off the palm for the finest apples ever exhibited or, at least, said to have been the finest. These apples were sold and used in the city of St. Louis for decorat-

ing the windows of some of the largest stores. They were not only ornamental but the flavor was elegant. These apples were sold before any of the other exhibitors had a bid. The beauty and flavor of these apples is attributed to judicious spraying.

The apple tree borer is still doing more injury than we are aware of. We have found this borer where people did not in the least suspect it. I cannot give my authority, but I have been informed that this flat-headed borer had a very effective enemy in a species of ichneumon fly which, in some of the counties from which the apples come, keeps the borer in control. If this is correct, we would suggest that a study of the fly be taken up by our State Entomologist.

The bird-shot borer is in evidence in many parts of the State in our peach orchards and is one of the most difficult pests to control and, therefore, is spreading rapidly. I have not heard of any other insects than the usual ones that attack the peach, plum, pear, cherry and other fruits this year.

The San José Scale can be controlled by the use of the salt, lime and sulphur wash, and wherever this remedy has been used it has not only demonstrated its effectiveness on the scale, but proven to be one of the best fungicides and remedies for other insects; and, therefore, we would urge this Board to use every means in its power to assist our Economic Zoologist in his efforts to induce all whose trees are infected to use this remedy; in fact, it seems to us it would pay to use the lime, sulphur and salt wash where there is no scale. I recommended this solution in the western part of the State where there is very little or no scale, to destroy the fungi with which the fruit is affected and to keep the trees clean. The insects affecting the cereal crops have, so far as we could learn, done no more than normal injury to the crops. It seems that the Hessian fly is kept in check by its parasitic enemies of which there are at least seven primary parasites in this country. The chinch bug has not done very much injury to crops this year, to the best of our knowledge. A great deal of work has been done in the states of Illinois, Kansas and Wisconsin, in introducing fungus diseases for checking the operations of this bug which, up to this time, has not shown very encouraging results. It seems that the army worm has not been very destructive this year and that it has been kept in control by its ever present enemy or parasite, the Tachina fly. During our tour of the western counties, we came across a corn smut which has done considerable damage in those counties.

Insects effecting the health of our rural districts, is a subject which should receive the attention of this Board. The malaria-bearing mosquitoes should be studied and remedies prescribed for their extermination. Frequently we hear of outbreaks of typhoid fever in rural districts for which there seems to be no apparent cause; but which, if it were possible to make a thorough examination, could be traced to insects, such as house-flies, carrying the germs from infected districts.

We cannot conclude this report, without commending the very efficient work done by our Economic Zoologist, Prof. H. A. Surface, and bespeak the co-operation of this Board in assisting him in every way possible in the future as in the past.

MR. HUTCHISON: The Professor spoke of Oregon apples in his

report. I would like to inquire under what conditions they were raised.

PROF. MENGES: They were raised not so very far from the Columbia River, and they were sprayed thoroughly. They were the most magnificent apples I ever saw, even a tree agent could not describe them so as to come within a hundred per cent. of the quality.

The CHAIR: What will you do with the report of the Entomologist?

MR. HUTCHISON: I move that the report be received and placed on file.

COL. DEMMING: If a novice can present such an able report, what may we expect when he becomes an expert?

The motion being seconded, it was agreed to.

PROF. SURFACE: Mr. Chairman, I have some interesting specimens in connection with the Entomologist's Report, and if permitted, I shall be glad to exhibit them.

PROF. MENGES: I should be only too glad to have Prof. Surface do so because he has opportunities that I do not begin to have.

PROF. SURFACE: The report of Prof. Menges is certainly commendable and admirable in every way, and I would not have it understood, when I speak about supplementing it, that I shall attempt to refer to anything that he has omitted, but rather to what he has had to leave unsaid, for within the time allotted him he could not cover the entire subject. It is impossible to give you a complete report on any subject in twenty minutes.

I have here to present to you for examination, just as it was shipped to me, some of the scale insects that attack fruit trees. That is one of the leading topics of interest in our State to-day, as these pests are causing thousands of dollars' worth of loss in fruit, and hundreds of thousands of trees. The twig of largest diameter, which I have here, is covered by thousands and thousands of San José Scale insects. I shall pass this around and some of you now, who may not be present here to-morrow, may look at it.

I have here other specimens of insects and other things that have been taken for the San José Scale. I have here also some of the eggs of the katydid, among others, that have been taken for San José Scale. As Prof. Menges said, the pest can be controlled, but there are comparatively few who can determine its presence.

The CHAIR: The next thing in order is the report of the Ornithologist, Prof. H. A. Surface.

Prof. Surface made his report as follows:

REPORT OF THE ORNITHOLOGIST.

By Prof. H. A. Surface, *Economic Zoologist, Harrisburg, Pa.*

I beg to submit the report of the Ornithologist under four heads: The increase of interest found during the past year due to the work of the Audubon Society, due to the papers put out by the State Department of Agriculture, due to previous reports that have gone out through this Board, particularly in the last Annual Reports. You will find in the Annual Report for 1903 two previous reports of your Ornithologist. Had I the time I could run through the list of birds concerning which I have written during this last year. Each of these birds represents a distinct species discussed in our correspondence or direct investigation. It is a difficult thing for a person without proper help, who has a correspondence of three thousand letters a year, to carry on scientific investigations so as to get the result desired.

I have in this jar (exhibiting jar) the bodies of two specimens of quails with the skins removed. They were sent to me from Luzerne county, received there from Massachusetts, and sent to Massachusetts, I think, from the South. You will see that they are smaller specimens of quails than any in our State. They were dying by the score, and these were dead birds. The person who sent them to me wanted me to examine them and if possible state the cause of their death and give him a remedy. You will see that they are very much emaciated. I examined them and found them covered by hundreds and hundreds of lice. They were in very bad condition. Their crops I also found to be full, as you see here. I dissected them and found the intestines were crowded by hundreds of Nematodes or pin-worms, such as I discussed in my Monthly Bulletin for December, 1904.

You will see under the word "Nematelminthes" a discussion of the internal parasites of animals. Any person wanting those bulletins may have them. Those Nematelminthes or Nematodes live internally in the birds. Their eggs are voided with the excreta and taken up by other birds and hatched out into internal worms again. That is what has caused the destruction of these particular birds. It is bringing into your region a very serious pest or disease, which also attacks other fowls or birds. It is not for me to give at present the remedy for this. You will find it in Dr. Pearson's "Diseases of Poultry," issued a few years ago.

I have here specimens of mice that were taken from the stomach of the Barred Owl which lives on rats and mice, and, therefore, in my opinion should not be killed. These specimens that I put before you here show my reason why it should be preserved.

I have the stomach contents of other birds here, particularly the hawks and owls, concerning the economic value of which there is some dispute. Here is a bird found throughout our State (exhibiting same). It is the barn owl, also called the monkey-faced owl. It is found as far north as the northern limits of this State, but is more

common in the southeastern and southwestern parts. Here is a bottle containing mice that I took from the stomach of this bird; it does not feed upon pigeons, poultry or game birds. I have examined many of them and never have found any poultry in their stomachs.

Last summer I was riding along the road, and in passing a barn saw one of these barn owls nailed to the barn door, while at the instant of my passing, just beneath it, the rats were chasing each other around the barn. It appeared to me that this was a striking illustration of the results of acting in ignorance of the character and value of these birds. I do not think it is best to leave the indiscriminate shooting of owls or other birds to the average citizen.

Now, I intended to do a very peculiar thing this evening. I have here a Long-eared Owl which was sent to me yesterday—and by the way, this emphasizes the point, that whenever you have any specimens that come into your hands, I shall be glad to have you send them to me in order that I may study them and preserve them for our State museum. I intended to open this bird here in your presence and show you that my faith in it as a mouse-eater is well-founded, and I may do it yet before the evening is over.* Here is a bottle with the stomach contents of this kind of owl (referring to a bird exhibited), and as you see, the contents of this bottle are mice and rats, taken from the stomach of one of these Long-eared Owls. Here is a rat taken from the stomach of one of them.

Here are two birds commonly called sap-suckers. They are not really sap-suckers, but the smaller one is the Downy Woodpecker and the larger one the Hairy Woodpecker. They differ in size only. (The Professor exhibited specimens of beetles.) Here are beetles, commonly known as shot-hole borers, taken from the stomach of one of these woodpeckers. You are familiar with their holes in the trees. The only remedy for these is the birds.

This small vial contains the stomach contents of another woodpecker, the Flicker. You will see that among them there are ants which are destructive, as they take care of the plant lice that feed on the roots of the corn, etc., excavating burrows that lead to the roots of the plants. The Flicker is the chief bird to destroy ants and also certain wood-boring beetle larvae.

I think this demonstrates to you the value of investigations along this line and the need of knowledge on such subjects. These are the birds that are frequently persecuted and killed. When I was a boy at home on the farm, we used to stone them and kill them because we thought they were sap-suckers and injured the trees; but instead of that, the woodpeckers, chickadees, nut-hatches and creepers are the chief enemies of the codling moth; no birds in the State of Pennsylvania are more valuable for destroying the codling moth than are these species that I have in my hand. It is unfortunate that these birds are often called "sap-suckers;" they are consequently persecuted unjustly. I would also call your attention to the fact that at the present time they can reach the eggs, larvae and chrysalids of certain kinds of insects that could not readily be destroyed at other times. For example, the codling moth is in the

*Upon examination of its stomach later it was found to contain two short-tailed Meadow Mice or Voles, which are very destructive.

worm stage now. You will find it in silken cocoons under the loose scales of bark, around the trunks of fruit trees. It is a good time of year to scrape the trunks of trees and burn the scrapings; in that way you will be able to destroy the larvae of the codling moth. If you will take the worm or larva of this moth and put it in a bottle with a netting or cloth over the top and keep it there until spring, you will get the little brown-colored winged codling moth that lays its eggs in the apple orchards, just after the petal falls and causes wormy apples. These are the different birds that destroy these pests.

I wish to report upon the publications issued from the office of the Economic Zoologist. I have put out during the past year three bulletins devoted entirely to our birds—I am speaking now of what has been done since our last meeting. These are the Quarterly Bulletins of the Division of Zoology. There was a bulletin devoted to animals of Pennsylvania that were exhibited in the St. Louis Exposition, to illustrate the economic features of the birds and mammals of our State.

In August we continued the series on "The Economic Value of Our Native Birds," and discussed those two very important birds, the Black-billed and Yellow-billed cuckoo. These are the birds most destructive to the hairy caterpillars. It makes no difference how hairy and spiry these may be, none are rejected by them, although no other birds will eat them freely. Their benefit to the horticulturist is very great.

Not only in the Quarterly Bulletins, but each month, I have something in the Monthly Bulletins touching upon the habits or preservation of insectivorous birds. In the last bulletin, which has just come out, we discussed quail and "The Care of Winter Birds." There were fifty thousand bulletins mailed from our office last week. Let any man imagine what a job it is for two persons to handle from fifty to seventy-five thousand bulletins, yet the people are calling for them. They want them and seem to appreciate them. If it were a mere labor of love alone, it should not be done any longer; but as long as the people of our State seem to be profiting by such publications, they will continue to be issued while we are able to do so.

I wish to report upon the general progress of Ornithology. Societies continue to be organized for the protection of our native birds. The Audubon Societies of the various States in America have at last come together and formed a National Audubon Society; the purpose is the preservation of all song and insectivorous birds. It is an erroneous opinion among many persons that the object of the society is to keep women from wearing feathers on their hats; that is not it. The object is to preserve all bird life that is not known to be obnoxious. In our own State the Society has grown. Several publications have been issued by those societies. I shall speak of these in a moment, and show them to you. I have some for distribution in the room.

Legislation affecting our birds has been enacted in many states, which have passed what is known as the Model Bird Law. Louisiana has recently fallen in line, and passed what is believed to be the very best law for the protection of bird life. Birds have been

slaughtered by thousands and thousands in the Southern states, and it has been stated that there was very little use in attempting to preserve our birds in the North as long as the Southern states paid no attention to their preservation. Now the Southern states are actively co-operating with the Northern states, because they have come to believe that the salvation of the farmers and fruit growers of our country lies in protecting these birds. Still there must be more education along this line.

I received only yesterday from the lecturer of the National Grange of the United States a request for some of the illustrations in our bulletins that I have shown this evening, because they intend to equip their lecturer with illustrations upon bird life and animal life, animal breeding, plant breeding, etc. In that way they help to spread the knowledge of the benefit these creatures confer in the interest of agriculture.

The State of New York has prepared a series of six lectures upon birds, insects and other creatures related to farm life or rural life. In this connection I may mention, that the State of New York has thirteen professional men working in entomology alone, while this State has only one. No wonder New York leads the Union in the production of certain fruits, dairy products and truck crops, when such State support is given to the underlying sciences.

It seems to me that your Economic Zoologist, who has been trained along scientific lines for the purpose of making scientific investigations, should not be obliged, for a small appropriation to aid his work, to turn lobbyist and politician in the endeavor to secure necessary legislation. He should have the opportunity to devote his energies to research instead of feeling obliged to go begging for an appropriation to make it possible.

I wish to call your attention specifically to some of the ornithological publications that have been issued during the year. Here are the nine different periodicals of this nature issued in America. One of these I have just received to-day. Here is a book called "The Color Key to North American Birds," by Reed and Chapman, one of the very best bird books that I have seen.

My next Quarterly Bulletin will be devoted to the woodpeckers; and if arrangements can be made we shall have the woodpeckers that inhabit our State shown in their natural colors. Here is an Ohio bulletin upon the Crow and another upon the Flicker.

There has also recently been published in Ohio a large book entitled "The Birds of Ohio." The text is excellent and the plates show the birds in natural colors. It is a valuable addition to the ornithologist literature of America

The State of New Jersey in the last report of the State Board of Agriculture, has a very valuable article on "The Useful Birds on the Farm, and How to Attract Them."

Our own State has issued, not only the publications to which I have called your attention, but Dr. Kalbfus has issued a pamphlet entitled, "Save Our Birds." His idea is to put out poison for the destruction of wild-cats and foxes destructive to birds. These are for distribution to persons who may care for them. There is also issued by J. Warren Jacobs, of Greensburg, a pamphlet entitled, "The Story of a Martin Colony," with a picture of a bird house in exact

imitation of the Pennsylvania building at the World's Fair, in miniature. There were ninety-six martins living in this house at one time. The same ornithologist has issued recently another pamphlet entitled, "The Haunts of the Golden Winged Warbler." Also the history of Beaver county, Pennsylvania has recently been issued, and in that is an appendix devoted to the birds and mammals of Pennsylvania by W. C. Todd, of the Carnegie Museum.

Massachusetts has been active. In their Crop Reports Dr. Forbush has published several bulletins devoted to birds, many of them in the form, called leaflets, on such subjects as "Bird Houses," "The Long-eared Owl," "Hints for Aiding Bird Study," "How to Approach the Birds," "How to Find the Birds." "How to Identify the Birds," "Our Friend. the Chickadee;" and also on "The Destruction of Birds by the Elements," showing what a terrible conflict there is going on all the time in the struggle of birds against the elements; they surely need our protection, especially in winter. No wonder that the Audubon Society of the United States has called attention to this. Dr. William T. Hornaday. the director of the New York Zoological Garden at Bronx Park, published a statement that during the last fifteen years, fifty-one per cent. of the birds of Pennsylvania have been lost.

The State of New York has recently put out a very admirable publication entitled, "The Economic Value of Birds Throughout the State." This is by F. M. Chapman. This book has plates in natural colors and is issued by the New York Fish and Game Commission.

All these publications may be examined here by those who wish to see them or they may be further examined at my office at any time.

Even the State of Utah is coming up. They have in the State of Utah a new paper entitled "The Desert Farmer," and in that paper is a regular department of "Economic Ornithology" conducted by a very capable person. Other states have also issued some bulletins and the Audubon Society is constantly issuing leaflets devoted to certain subjects with a view to safe-guarding the birds, and protection against gunners. I have here for distribution some educational leaflets treating on certain birds, such as the robin, various kinds of hawks and owls, the night-hawk, the turtle-dove and others. A person may read them and see for himself what they contain.

In speaking of investigations, I should have added one point more: It has been claimed by ornithologists that the wild pigeon is extinct in the State of Pennsylvania, and that it has been extinct for some few years. But last year I received a specimen of the wild pigeon and I intended to bring it down and show it to this audience at this time. It came from McKean county, where there were about seventy-five or eighty birds in the flock. It shows that the wild pigeon, if it were exterminated from our State, has returned, and it may again take up its abode here if it receives proper protection. At the present time there is no closed season upon it whatever. I believe it is intended to give it ten year's protection by our new game law.

The "Boll-Weevil of Louisiana" is the title of another publication that I have here, treating of the birds that destroy that pest.

The progress of ornithology in Pennsylvania is indicated by the numerous inquiries concerning birds and their relation to crops and the insects they destroy, and indicated further by the great number of specimens that are sent to me for the study of the stomach contents and preservation or for answers to inquiries.

(The Prof. exhibited a small earthen jug). Among my experiments during the past year was one in putting up a number of boxes with entrance holes of different sizes to learn exactly the smallest sized hole that the English sparrow would use. The Wren is smaller than the English sparrow, and I found that the smallest possible size that the English sparrow can squeeze into is one and one-fourth inches; now into this little hole (referring to small hole in the earthen jug held in his hand) the wren will go, but the English sparrow can not. In addition to bird houses that are to be built, we have these little jugs for wren's nests and I believe that it will be a successful and unique contrivance. They sell at twenty-five cents each or $2.50 a dozen, and may be obtained from Henry Dreer, of Philadelphia. There is an increasing interest in bird houses and I have been making a study of the kinds of birds that nest in them.

Finally, I wish to call your attention to what I consider highly desirable legislation. Many do not know that there is a law at present in this State providing for a rebate of taxes to persons who plant trees along the roadside. I have recently had occasion to notice the provisions of this law, requiring that the supervisors shall keep a book for this purpose in which shall be kept a record of the trees so planted and by whom planted, etc. The Deputy Attorney General has rendered an opinion that the supervisors can be made to keep this book so that the proper rebate of taxes can be determined, under the law, and the tax must be refunded when the trees are planted, as required. These trees may be fruit trees, such as cherry, mulberry, service or hackberry; in fact they may be any kind of trees that one may wish to plant to protect and feed the birds and afford shade.

I would also call your attention to the new game bill that has been drafted. It presents many excellent points, and whatever we have to say against that game bill ought to be fought out right here tonight so that we may stand together on it. It is almost impossible to draft a bill that suits everybody. As your ornithologist, I should recommend a few modifications. It is proposed to list the pigeon hawk, the king-fisher and the barred owl as unprotected birds.

I would object to destroying the pigeon hawk, but not so seriously as to make it an issue. The sparrow hawk may be killed if others desire it. I would object more seriously to the destruction of the king-fisher, for the reason that it eats suckers to a very great extent, and suckers are the enemies of trout. But I would not object so much to putting king-fishers on the list to be slaughtered as I would the barred owl. I think it ought to be protected absolutely.

Second: I do not believe that from a scientific and practical standpoint it is advisable to put out poison over the woods and fields of our State. I have many reasons for this. I do not know that I need to enumerate them now; I know that during the past week

two "trained" men know that they have thus killed only one opossum, but also three dogs. I object to the principle involved in killing animals by poison. It is antiquated, and does not meet the approval of modern scientists.

Third: I do not think that blackbirds should be listed as game birds. They are not game birds anyhow; whoever heard of shooting a blackbird for food?

Fourth: I do not think a fifteen-day sale should be permitted. I think a three-day sale is long enough after the end of the hunting season.

Fifth: A statement of the law as drawn up provides for the killing of birds at anytime they are destroying crops. I think the robin, the bluebird, the thrush and other birds will occasionally take a cherry or other fruit, but not to any great extent if properly provided otherwise. I do not think the average farmer or fruit-grower, should be permitted to kill any and every bird just because it takes a little fruit. He can better afford to lose the fruit than to destroy all the birds. The kinds or species of birds to be killed should be limited to as few as possible.

The CHAIR: You have heard the remarks and paper of Prof. Surface. What is your pleasure in the matter for the disposition of this address?

It was moved and seconded that it be embodied in the report of the meeting, which was agreed to.

MR. NELSON: I want a little information on the sap-sucker. I should like to ask Prof. Surface why they tap trees in the spring? There is one variety of apple tree that they make a regular business of it in the spring. I have tried to find out whether they get any insects or not, but they don't; they seem to do it on warm days when the sap flows, and I would like to know the reason.

PROF. SURFACE: That is done by the true sap-sucker, a bird that migrates through this State in the spring and fall; that is not the bird to which I have referred. The reason why he does that is that he uses some of the sap for food, and also takes some insects for the same purpose.

The CHAIR: The next thing in order is the report of the Committee on Poultry, Norris G. Temple, Chairman.

Mr Temple read his paper which is as follows:

REPORT OF THE COMMITTEE ON POULTRY.

By Norris G. Temple, *Chairman.*

The year just closed was, for the poultry fraternity, one of unprecendented success. This was made possible by the favorable conditions during the hatching and rearing season, and the unusual high prices prevailing both for fancy and market purposes and eggs.

Never were the prospects brighter for a record-breaking year than at this time.

The show of poultry at the St. Louis Exposition was the largest ever gathered in the United States, and as one writer has very aptly said: "It was a collection of the wisdom and achievements of the world brought together for the inspection of the world for example and study by its experts. It constitutes a compact, classified, indexed compendium, available for ready reference of ideas and achievements of society in all phases of its activities, extending to the most material as well as to the most refined." Of this vast array of prize birds, you will hear more fully from Mr. Cornman.

It is only within the last few years that the poultry industry has received any attention from the agricultural colleges and experiment stations of the United States. At the present time, however, these institutions are realizing the vastness and importance of the poultry interests, and a few of them are endeavoring to offer substantial aid to those who desire to make this important topic a study.

At the present time over twenty-five hundred (2,500) students are doing good work in the correspondence courses offered free to all along the lines of agriculture; and I am informed the most popular course is that devoted to poultry-keeping. The educational work that is being done at State College along the lines indicated, with the poor accommodations offered, is truly marvelous. The poultry homes are few; yards small and no adequate quarters for hatching and rearing young stock either by incubator and brooder or the old method. We hope to see this condition very much improved ere another report is made. The experiment station and the general public have a higher appreciation of the industry at the present time than ever before.

There is room the whole country over for lectures on pure-bred poultry at the grange meetings and farmer's institutes, and we must have them. There is no place where progressive farmers can be reached more readily than by these winter meetings. Local poultry associations are always in close connection with farmer's institutes, and the leading lights of them should do all they can to help procure talkers on poultry topics. The one need to-day is more learning about poultry. Twice the hen's annual production can be made if a better grade of fowls is bred on the farms. Would it not be a good idea for the associations that hold shows during the winter to arrange programs which could be attended free and devote one evening of the show to a real "chicken talk," which would be of value to all farmers and their wives who attend? Poultrymen do not play enough to farmers. They being the ones who breed the major portion of the country's product, why not appeal to them more effectively?

A poultryman should look over his stock carefully and decide what things are worth and if he can afford to keep them at any price. There is more money lost in the fatal indecision of not ridding the poultry-yard of the old non-producers than in any other way. We can make but a few dollars profit on the best of each class of stock and a few poor ones consumes that. Not more than one-half the stock kept pay for their food at market prices, and so many of us are undecided what the profit is, or which one does pay,

that we do nothing but simply take what is left and be satisfied that it is not less.

It takes as many years to learn the principles involved in profitable poultry culture, as it does to learn manufacturing business or professional occupations. One of the greatest reasons why people utterly fail when they undertake poultry raising, is because they lack previous experience. The assertion is often made that the "poultry business is an uncertain one." This is absolutely a false impression. It is not the business that is uncertain, but the operator; hence the failure. There is an unlimited and growing demand for the product of the hen. Thousands are marketing this product at remunerative prices.

People want a fixed ration compounded by some set formula, and then put up in bag lots so that they may be no trouble in the preparation. They overlook the all important fact that something more is needed to supply food elements. The very best egg food is exercise. Not that this supplies the system with all that is needed, but it prepares the way for the food to be taken with benefit and profit. The more active breeds are always the healthiest and most productive, simply and only because the physical exercise keeps their bodies in a normal, healthy condition, and enables them to stir up food for the production of eggs. Activity, then, is one of the essentials in the poultry-yard. We cannot turn our domesticated fowl loose to search after their own living, but we may take a step in that direction and put the food we supply where there must be steady work to find it.

The real fancier does not estimate the results of his labor wholly in dollars and cents. There is a peculiar charm in the culture of beautiful fowls, and if true pleasure counts for nothing then we may say there is nothing in life of any value. We can get more in the way of enjoyment and healthful exercise from a few hours each day spent in the poultry-yards than can well be estimated in money. From shell to maturity the fancy fowl is a study and will interest every breeder who is as enthusiastic as he should be. If he does not look more to the improvement of his favorites than to the dollars and cents they will bring him, the probability—if he will only be a very ordinary breeder—he will never be a greater one. Money is an object, and gives added zest to even the most pleasurable pursuit.

The point I wish to make is that the true fancier is not a money fancier alone, but loves his business and aims at the highest possible standard for the stock he breeds. To reach this end he keeps his best birds and money won't tempt him to sell them. Neither will money tempt him to sell inferior stock. What we want is more high-minded fanciers and fewer hucksters. I am convinced we have a great many of the former, but we need less of the latter.

The pleasure we can obtain in the work of making a living is no small part of the compensation to take into consideration, for if we do not enjoy it as we go along and while we are in the work we are very apt to never enjoy it at all. Too many are waiting until they have accomplished some particular object before they expect to enjoy the results of their work, but that is all wrong; their objects are always in the future, for as soon as we have accomplished one

thing there has appeared on our horizon another, something to be completed or attained before we can feel free to enjoy the results of our work.

The fact is there is more real enjoyment in trying than in the actual results themselves, and we should not allow ourselves to be cheated out of the pleasures that are in the work of attaining the object set before us. To live in the present and embrace the opportunities and pleasures of each day as they come, is to realize the most and best of the future which is continually just beyond our reach.

"Hope high, and strive ever and count it not lost,
If your gold be but tinsel, your diamonds but dross:
For he is still rich, though by fortune forsaken,
Whose fortress of hope by despair is unshaken."

The CHAIR: What is your pleasure in regard to this paper of Brother Temple? What shall we do with the report?

It was moved and seconded that the report be adopted as read and placed on file, which was agreed to.

The CHAIR: The next thing in order is, "The Importance of Poultry as a Farm Product, by J. D. Nevins.

The following paper by Mr. Nevins was then read:

THE IMPORTANCE OF POULTRY AS A FARM PRODUCT.

By J. D. Nevins, *Germantown, Pa.*

There are two birds in this country that are much talked about: The one, the great American eagle, so often referred to by our patriotic and eloquent Fourth of July orators, one of whom told how that, on the fourth of July, 1776, she chewed up her iron cage, flapped her mighty wings, and with a Yankee Doodle scream, soared aloft; the other is the little American hen that, while the eagle soared to light and rest on the highest crag of the loftiest peak of yonder mountain range, was laboring in a farmer's pen, unheard and unseen, to add her might to the stupendous wealth of this, the greatest nation on the face of the earth, proving that the "pen" is more important than the "soared," and the "scream of the eagle" is of less value than the "lay of the hen;" and it is this "lay" that leads us to consider for a short time her importance as a farm product.

The location, condition and size of the farm will, to a very important extent, determine the advantage that poultry would have as a farm product over that of the dairy or seed crops. Throughout the east, the dairy is, probably, the most important industry,

and it is with this that I will make my comparisons as to income derived from poultry.

Poultry can be kept with profit on large or small farms; but not on the large farm, to the relative advantage, as on the small one. The census of 1900 gives the number of farms in this country as 5,739,657, one-third of which contains less than fifty acres. Of these, 675,458 have less than twenty. Farms of this smaller size cannot, under ordinary circumstances and conditions, be made to pay as dairy farms. I would not say that it is impossible, as one of your honored members has demonstrated, to a degree, that most of us would believe impossible. He has, by the application of unusual brain-power, and the unlimited use of fertilizers, made it possible to sustain twenty-five head of cattle on fifteen acres. This, surely, is the highest order of intensive farming. There are few Dr. Detrich's, and too much honor cannot be accorded him for the important lesson he has taught us of the possibilities that can be accomplished by scientific farming.

We will now compare the value of dairy products with those of poultry, as given by the census report. There were, in the year 1900, 19,081,699 cows in the dairies of this country, whose estimated value was $566,375,739. The product of these cows in milk, butter and cheese, was worth $472,276,793. The value of each cow was $29.68, and the value of her product $24.75, or $0.84 cents for each dollar of the cow's value. At the same time there were in this country 250,681,673 chickens, turkeys, geese and ducks, valued at $85,794,996, and their product was worth $281,178,035. The value of each fowl was $0.29, and the product of each $1.12, or $3.27 for each one dollar value. As before given, the cow has to her credit per dollar of value $0.84, and the hen to her credit per dollar of value $3.27, or four times that of the cow. The values above given for cows, $29.68, chickens, turkeys, geese and ducks, $0.29, no doubt is very low for this part of the country. The price of each would be relatively the same in any section of the country—that is to say, that if the one is worth $29.68, and the other $0.29, in one section, it might be $60 for the one and $0.60 for the other in another, and their products would vary in like proportion, and the value of one cow would still be that of one hundred chickens, and their products would remain four to one in value in favor of the hen.

It is not location that governs the value of the cow so much as does her breeding and her capacity to produce milk or butter. Cows sell for from $25 to $2,500, or even higher, and for the hen the same will apply, as her value will be determined by her breeding and capacity to lay eggs. The highest price at which a herd of cattle was ever sold was, no doubt, that of Mr. Campbell, of New York Mills, N. Y., whose herd of shorthorns, one hundred in number, sold under the hammer (that is, at public auction), for over $300,000, one cow bringing $40,500, and some six or eight $25,000, or over, each; one calf selling for $16,000. The highest price ever received in this country for fowls was by Mr. George Northup, of Raceville, N. Y., who sold this last year nineteen R. C. Black Minorcas for $3,400, as follows: One cock, $1,000; one cock, $500; one cock, $200; one hen, $200; fifteen hens, $1,500. These birds were sold to Mr. Von Schultzenstine, Berlin, Germany, who came to this country

for the purpose of buying them. He also made an offer of the same average price for twenty-five more, which would have been $178.95 each, or $4,473.75 for the twenty-five; this, with the former sale, would have given him for forty-four birds, $7,873.75. Now where is the high price for cows? There are thousands of birds sold yearly for from $5 to $50, each, and thousands of dozens of eggs at from $2 to $10. I have sold them at $15 per setting of thirteen.

I am not advocating farmers taking up the breeding of fancy fowls as a farming product, nor would I have them believe that if they did they would sell them at the prices just named. I would, however, urge them to breed pure-bred fowls of some one of the many varieties we now have, knowing they would receive far more profit from them than they could from so-called barnyard fowls. We all admire the beautiful in form and color, and when both are combined in one object, be in cow or chicken, it is especially to be admired. It is said, "A thing of beauty is a joy forever;" this being so, the farmer, fortunate enough to possess a flock of beautiful fowls, would be kept in everlasting ecstacies. A flock of fowls, uniform in color and shape, are attractive, of whatever variety or color they may be.

False ideas as to the income to be derived from poultry is too often exploited in our poultry papers. These writers would lead us to believe that all we had to do would be to get a few hundred hens and our fortune would be made. It would be a misfortune for any one having a business that was returning him a fair income to quit it and take up poultry as a single means of making a living, unless he had studied the hen and kept them in sufficient quantities to assure him to a reasonable extent that it would be a success; without this knowledge he would be about as he would be in taking up a trade that he knew nothing about. The keeping of large flocks of fowls in comparatively limited quarters, requires the utmost care and strict attention to every detail. It is the last business a lazy man should undertake, for in this eternal vigilance is the price of success.

The profits derived from poultry is governed largely by the care and proper housing given it, as it would be that from any other live stock. Does poultry receive the same care and attention given other stock on the farm? We fear not; at least, not by the average farmer. Poultry allowed to shift for itself, left to roost in the trees and on the fences, or, what is worse, in houses full of cracks, that admit of draughts, and with leaky roofs, and cleaned but once or twice a year; and, if fed and watered at all, only at irregular times and in uncertain quantities, cannot be expected to produce eggs in satisfactory numbers. As well ought we expect a cow to keep in good condition and give a paying return in milk and butter when allowed only the shelter of a straw stack and fed on corn stalks. It requires us to give our best attention to any business to make it a success.

Dairying and stock raising is considered by the majority the best and surest way of permanently maintaining the fertility of the farm. This may be and, no doubt, is true in many cases, and it is often the only profit worth speaking of that they derive from the dairy, and it might be considered no small profit, if by it they

can keep their farm productive, as a productive farm is a farmer's best bank account. We find many farmers, who are prejudiced against poultry-keeping and if they keep it at all it is in a half-hearted way, never giving the same careful attention they give their other stock; it is merely a side-issue with them. We do not believe this of all farmers, but it is surely true of a majority of them. If they would give this branch of farm stock their especial attention, they would find it a more profitable and agreeable occupation that of the dairy. In giving the value of poultry products there is an important item that has not been mentioned in my former remarks, and for which they have not been credited; that is, the manure. The value of this cannot be questioned, as it contains fully double the nitrogen, phosphoric acid and potash that is contained in any other barnyard manure, and when properly taken care of, by keeping it dry so that none of its fertilizing properties are lost by exposure to the weather. This will allow of their being ground, or, by some other method, reduced almost to a powder, in which condition it can be much better applied to crops, or spread over grass land. Prepared and used in this way it would be of much value as the best commercial fertilizer, and when produced on the farm is certainly much cheaper. We think it would pay very nearly the cost of keeping the fowls, thus adding greatly to the profits derived from their egg and meat products.

Poultry is of special value when kept in connection with fruit, as each is an advantage to the other. Poultry, including young and growing chicks, will thrive much better where they have the advantage of good shade, such as fruit trees would give them. Plums, peaches and pears will produce much finer fruit and in larger quantities where fowls are kept with them, as they destroy many of the insects that are so injurious to them. My experience has been that plum trees planted in poultry-yards are sure bearers of the finest developed fruit. On small farms a combination of fruits and fowls, each given their proper attention, will produce better paying results, with less laborious work, than any other live stock coupled with farm crops.

If what I have said will lead any of you to consider the special benefit they might derive from an increased interest in and the careful attention to the breeding of poultry, in connection with their other farm industries, and by this means add a considerable increase to their incomes, I will have talked to some purpose.

The CHAIR: What is your pleasure in reference to this paper that you have just heard read?

PROF. SURFACE: I move its acceptance and that it be placed on file.

The motion having been seconded, it was agreed to.

The CHAIR: The next thing in order is, "Poultry at the St. Louis Exposition," by Mr. Charles T. Cornman.

Mr. Cornman read the following paper:

POULTRY AT THE ST. LOUIS EXPOSITION.

By Charles T. Cornman, *Carlisle, Pa.*

It was my privilege to be selected as one of the jurors on poultry at the Universal Exposition, St. Louis, an honor which I very much appreciated, especially when you take into consideration the fact that it was the largest collection of pure-bred poultry the world has ever seen and will see for years to come. The entries in the leading varieties was simply astounding, and the public had an opportunity to study those useful and beautiful varieties on a scale never before seen in the battle of the breeds. There were more than 1,600 Wyandottes, more than 1,300 Plymouth Rocks, more than 1,000 Leghorns and fully 800 in the Asiatic classes and enough entries in the American, Mediterranean, Asiatic and English classes to make the entries fully 6,000. The Wyandottes came from 29 different states, Plymouth Rocks from 24 states, ranging from Massachusetts to California, from Canada to Texas. The total entry of poultry was 8,350. The entries were booked from 41 states, territories and foreign countries. Missouri led in number of entries, with almost 1,000 birds, Canada, Illinois and New York following in the order named. Ohio, Indiana, Wisconsin, Pennsylvania constituted the next group of competitors. New Jersey, Iowa, Massachusetts, California, Michigan, Nebraska, North Carolina and Connecticut following closely in the order named.

When asked to address this body representing the agricultural interests of this great State, I consented with the understanding that I select my own subject. I did not select the above with the object in view of lauding the State of Pennsylvania for what she had done for poultry at the Universal Exposition or for what she has ever done for poultry, but rather to criticise her for what she has not done. The blush of shame mantled my cheek on more than one occasion when asked by a commissioner in the interests of poultry from other states, what has Pennsylvania done for poultry at St. Louis, and I was compelled to say, nothing, and also to have to confess that she has never done anything. Why is it that Pennsylvania will not awaken to the magnitude of the poultry industry of this country, and especially of this great State? It is useless for me to elaborate on the statistical reports of marketable poultry and eggs, for you are all familiar with that and every schoolboy knows that it exceeds the wheat interests. It is not my intention to touch that side of it but to give you, if possible, an insight to the pure-bred poultry side that is so rarely touched on.

Do you realize the fact that the yearly output of pure-bred poultry each year exceeds $200,000,000? Do you appreciate the fact that the poultry exhibit at St. Louis represented fully $250,000. Do you appreciate the fact that in this city of Harrisburg at the present time there is an exhibition of pure-bred poultry representing an

outlay of fully $25,000? Do you appreciate the fact that all over this State are held poultry shows, each representing tens of thousands of dollars invested in pure-bred poultry? And what are you doing to encourage it? Nothing. And why? Let me make a few comparisons as to what was done by other states at St. Louis. What did the Canadian government do? She said, get your stock in shape and we will pay all transportation charges, all your expenses and for every dollar you receive in premium money we will give you another one. Illinois gave $15,000 for live stock, Iowa $12,000, Kansas $10,000, Kentucky $7,500, Missouri, $100,000, Nebraska, $2,300, Wisconsin, $10,000 and Oklahoma, our baby state, $500, true, not much, but like the widow's mite, it will always be a record in her favor. But Pennsylvania the great Keystone State, the State that wants to pose as a model along all lines, we fail to find her name on the list as contributing one dollar.

At the banquet tendered the Poultry Jurors by President Francis of the Exposition, Frederick J. V. Skiff, Director of Exhibits, said: "We had the largest horse show the world has ever seen and the attendance was large. We had the largest cattle show the world has ever seen and the attendance was large. We had the largest hog and sheep show the world has ever seen and the attendance was large; but low and behold, poultry, insignificant poultry, so considered by many, has shown the most marked increase in attendance and the interest was clearly manifested by the crowded condition of the poultry barns. In fact, it has been clearly demonstrated that the attendance at the poultry exhibition exceeded the combined attendance of all the other live stock exhibitions." I have every reason to believe it was only truth that fell from his lips and not empty compliments. Let us all look forward to the time when this great State shall become an object-lesson in all those things that pertain to better poultry and more of it.

On motion, the report was accepted and ordered placed on file.

Meeting adjourned until to-morrow morning at 9 o'clock.

Wednesday Morning, January 25th, 1905.

The meeting was called to order by Chairman Clark, at 9 A. M.

The CHAIR: Now, gentlemen, this session will evidently be a very busy one this forenoon, if we accomplish what is placed in the program. First, we will have the report of the Committee on Credentials. Then we shall be ready to proceed with the election of officers. Mr. Temple will make the report for the Committee.

REPORT OF THE COMMITTEE ON CREDENTIALS.

The Committee on Credentials Respectfully Report that we Examined the Credentials of the Following Persons for Membership in the State Board, and found them correct:

Name.	Address.	Term Expires.
S. S. Blyholder,	Neale, Armstrong county,	1908.
A. L. McKibben,	New Sheffield, Beaver county,	1908.
J. A. Herr,	Mill Hall, R. F. D., Clinton county,	1908.
John H. Witman,	St. Mary's, Elk county,	1908.
C. R. Hege,	Marion, Franklin county,	1908.
Jason Sexton,	North Wales, Montgomery county,	1908.
R. J. Weld,	Sugargrove, Warren county,	1908.
D. S. Taylor,	Raccoon, Washington county,	1908.
G. F. Barnes,	Rossville, York county,	1908.

The Committee on Credentials further report that we have examined the credentials of F. E. Field and found them not in due form and we recommend, that when he files them in proper form with the Secretary, he be admitted as a member of the Board.

The Committee on Credentials further report that we have examined the credentials of the following persons, representing agricultural organizations, and recommend that they be admitted to sit as advisory members:

Name.	Address.	Representing.
A. F. McHenry,	Clarion, Pa.,	Clarion County Fair Association.
J. W. Buckhout,	Lititz, Pa.,	Lancaster County Poultry and Pigeon Association.
Prof. H. A. Surface,		State Farmers' Alliance and Bee-Keepers' Ass'n.
John L. Cathcart,		Indiana County Agricultural Society.
H. M. Keller,		Adams County Agricultural Association.
From Lebanon County Agricultural and Horticultural Assn.		
A. P. Heilman, M. D.		
Jacob M. Grash.		
Edward Shuey.		
Morris S. Ulrich.		
Peter R. Boltz.		
State Horticultural Society.		
Earl Peters.		
John F. Boyer.		
Jacob L. Rife.		
Dan'l D. Herr.		
Enos B. Engle.		
John T. Patton,		Warriors' Mark Grange No. 974.

(Signed.)

M. N. CLARK,
GEO. G. HUTCHISON,
NORRIS G. TEMPLE,
Committee.

The CHAIR: You have heard the report. What is your pleasure?

On motion, the supplementary report of the Committee on Credentials was adopted.

MR. TEMPLE: The Committee have a recommendation to make, and I move that this Board endorse the action of the Committee as to the admission of Mr. Field.

It was moved and seconded, that the report be accepted in accordance with the suggestion of the Chairman of the Committee on Credentials, and that the persons named by him be granted the privileges of the floor and the usual courtesies of the Board.

Mr. Sexton occupying the chair, the Board proceeded to the election of officers which resulted as follows: Vice Presidents: Geo. G. Hutchison, Huntingdon county; S. S. Blyholder, Armstrong county; Matthew Rodgers, Juniata county.

Executive Committee: A. I. Widener, Adams county; P. S. Fenstemaker, Lehigh county; Norris G. Temple, Chester county; S. X. McClellan, Clarion county; H. G. McGowan, Berks county; D. A. Kunppenburg, Wyoming county; A. J. Kahler, Lycoming county; J. Newton Glover, Union county; E. E. Tower, Susquehanna county.

MR. HERR: The Memorial Committee have a report to make.

The CHAIR: We are prepared to hear the report of the Memorial Committee.

The report was presented and read by Mr. Herr as follows:

Report of Memorial Committee No. 2.

Whereas, Death being no respecter of persons, we learn with sincere sorrow of the decease of our friend, Ex-Gov. Robt, E. Pattison, prominent in the affairs of the Nation, the State, and a member of this Board, always, when in session, participating in the proceedings and encouraging agricultural interests. In the death of our distinguished citizen and friend, the State has lost one of its most useful members and this organization one of its best friends; therefore, be it

Resolved, That the State Board of Agriculture hereby extend to the bereaved family our heartfelt sympathies and condolence;

Resolved, That these resolutions be entered on the minutes and a copy thereof transmitted to the family of the deceased.

J. A. HERR,
W. H. STOUT,
MATTHEW RODGERS.

The report was adopted.

The CHAIR: The first vice-president will please take the Chair.

Mr. Hutchison took the Chair, as requested.

MR. HUTCHISON: Gentlemen, I want to thank you for this honor, and in my humble way I will try to preside over you in fairness to all. We are now ready to proceed with the deliberations of the Board.

MR. HERR: I have heard nothing said yet as to the place of our summer meeting or the disposition of the matter. Do we meet in connection with the Institute Round-up? I want to offer as a motion that the time be left, or the privilege of fixing the time be left with the Deputy Secretary of Agriculture. I make that as a motion.

The motion being seconded, it was agreed to.

MR. SEXTON: Mr. Chairman, the matter of fertilizers and fertilizing our land with clover seems to be a very important question and the very useful paper that was read by Dr. Thayer yesterday it seems to me ought to be published and spread broadcast over this State. The advice in it was excellent and practical. I am not selecting his paper because it was so much better than others, but it seems to me that this paper on the growth of clover and how to do it, ought to be thrown broadcast before the farmers of this Commonwealth, and I move that the Department of Agriculture be requested to have that published in pamphlet form and distributed to the farmers of the State.

The SECRETARY: As a bulletin of the Department?

MR. SEXTON: Yes.

The motion having been seconded, it was agreed to.

MR. CLARK: I would like to offer an amendment to that. There are so many good articles written to-day along lines of this kind that I would like to amend that by adding, that with the publication of Dr. Thayer's paper, there shall be included any other matter in it of importance bearing on the growing of clover so far as it can be done without repetition.

MR. SEXTON: I will accept the amendment.

Mr. STOUT: Mr. Chairman, another thing I would suggest is that these papers be examined by the Secretary of Agriculture and anything that may be pertinent relating to our industries as farmers that ought to be disseminated because of their importance, shall be included in the bulletin issued by the Department; just an abstract or abstracts from these various papers, a sort of synopsis. The bulletins issued by some of the departments contain a brief review in the back part of the bulletins giving an abstract of the contents in a brief way, so that a person can look over them and get the gist of the matter in a short time; something of that kind, it seems to me might well be done in connection with this matter.

The SECRETARY: That is a very important suggestion of Brother Stout's, but I am afraid that that would place more work upon the Secretary than he would be able to accomplish. It would be no small undertaking to go over any single subject so as to cover the literature of parties throughout the State and that issued by the National Department of Agriculture and make such a selection as Mr. Stout suggests.

The Secretary is very busy, and while he is willing to do any amount of work that he is capable of doing, he fears that he would not be able to do that. If anything is to be added to this paper on clover, wouldn't it be well to let the Executive Committee have that matter in charge? I think perhaps they would have more time and would be able to determine what is most important concerning the growing of clover; there are eleven of them altogether and they would perhaps be able to determine better than the Secretary what would be best for the farming public generally.

MR. FENSTEMAKER: Wouldn't it be best to leave that to the discretion of the Secretary?

COL. WOODWARD: Mr. Chairman, it occurred to me to suggest —I am not ready yet to put it in the form of a motion—that possibly a number of the papers that have been read here are valuable for reference, in connection with the development of our soil. Of course, Mr. Sexton and others who have made this request for the publication of papers here, are probably particularly interested in certain subjects; there may be other papers that referrred to the development of our soil, and it occurred to me, following out the suggestion of the gentleman from Lehigh county, Mr. Fenstemaker, that excerpts might be made from the papers read here on this occasion, and published in the future Department bulletins.

The criticism of the Secretary is very proper; he cannot be compelled to do everything. It has occurred to me that if he would take this thought and develop it, and employ some experts to look over these papers upon the development of the soil, and publish a bulletin of that sort, gathered up from the material presented here at this meeting, it would prove a very valuable addition to our literature upon this subject. I heard the paper of Dr. Thayer yesterday, and was delighted with it, and I am glad to second that motion and to make this suggestion. I do not desire to present it as a motion. I think it would be valuable if we can gather the bits of valuable information and publish them as a bulletin in that direction, as an expression of the Board of Agriculture that would be a valuable addition to our literature upon that subject; and while there is an abundance of it, the expression of the practical experience of the farmers that constitute the Board of Agriculture would have its weight with the farmers of the Commonwealth.

MR. SEXTON: Mr. Chairman, the trouble with us as a Board of Agriculture is, we have not in the past had the work of the Board brought before the general public, and before the farmers of the State. We go home and they say, "What did you do up there at your annual meeting?" Our farmers know very little about what is done until the year after when the Department can get out the Report of the Department of Agriculture, and they wonder why we have any meeting at all. I think it would be a good plan to publish, so far as we possibly can, the valuable information presented here. I know that the Secretary is encumbered with lots of work, but so far as we can put the work before the farmers of the State, and let them know what we have been doing, I think it is very desirable.

The SECRETARY: It is the purpose of the Secretary to have published, as a bulletin of the Department, the entire proceedings of this meeting. It will be published first of all as a bulletin and that will be followed by the incorporation of this bulletin in our annual report. Everything that has taken place at this meeting will be published just as quickly as we can have the manuscript prepared and get it into the hands of the State Printer. We can give you about as many as you will care for.

The Chief Executive of the Commonwealth is exceedingly anxious that the expenses shall be kept down to as reasonable a point as possible so far as is consistent with the good of the Commonwealth, so he desires that there shall be no re-publication except in cases where it is necessary and requests the heads of departments not to make more than one publication of one docu-

ment. It is barely possible, if I have this published as a bulletin of this Department, then in the annual report, that I might be subject to criticism. It is better to have it published as a bulletin than in the annual report; but it is the thought of the Secretary of Agriculture to get it in both places, if possible, so that it may be preserved in the future in the formal report of the Department, and in the bulletin form, so that it may go broadcast over the Commonwealth as quickly as possible.

PROF. SURFACE: Mr. Chairman, if published in the annual report, it is limited to five thousand copies, while if it is published as a bulletin, it may go as high as twenty-five thousand, and of course reach five times as many people.

The CHAIR: Are you ready for the question?

THE SECRETARY: The motion was to have Dr. Thayer's paper published.

MR. SEXTON: I accepted the amendment of Mr. Clark and that covers the entire ground.

The question being on the motion, it was agreed to.

(Inasmuch as the entire proceedings of the meeting are published as a bulletin of the Department of Agriculture, it is the opinion of the Secretary that the purpose of the foregoing motion, as amended, is fully met, and it is hoped that this arrangement may prove entirely satisfactory.—Secretary.)

The report of the Executive Committee was called for by the Chair, but they were not ready to report. By request of the Chair, the Secretary read the names of the Executive Committee, and Mr. Weidner, the Chairman of the Committee, called the Committee together to meet in another room.

PROF. SURFACE: I have here a specimen of honey-comb poisoned by foul brood. As President of the State Bee-Keepers' Association, I have been asked to place this before you so that you may understand that one reason why your bees have died in great numbers in late years, is because this disease is not detected. I will leave it here for your examination.

The CHAIR: The report of the Chemist is the next thing on the program.

Dr. Frear not being present, it was passed over.

The CHAIR: The next is the report of the Mineralogist, Col. Henry C. Demming.

Col. Demming presented his report, which is as follows:

REPORT OF THE MINERALOGIST.

By Col. Henry C. Demming, *Mineralogist*.

CLAYS.

The numerous clay deposits of Pennsylvania are being investigated with more interest than at anytime in the history of the State. This is partly owing to publications by New York, New Jersey, Maryland and Ohio, on the clay beds of those states, with localities, names of owners, and analyses of products, together with the uses to which the clays may be applied. It seems that inquirers are not altogether satisfied with the clay productions of those states, and are looking for something better in our own Commonwealth. Kaolins, ochres and paint clays are called for, with an increasing demand for "glue" clays, and light-colored plastic varieties. A well prepared bulletin on Pennsylvania clays would be widely sought for by residents of other states, and by those at home interested in our argillaceous resources.

SILICA SAND.

The publication by this Board of the report on silicates one year ago has had a marked effect for good, and more care is shown in the selection of silica sand for mortar in plastering. Then more deposits of good, pure sand have been found, and first grades can be had at lower prices. This leads to purer plastering in newly erected buildings, and to much less danger of defective flues in chimneys. So pure and good have our best sands proved to be for filtration purposes, that there is fair reason to believe they will be adopted for use in the great sand filtration beds to be erected for improving the water supply of New York City.

CEMENT ROCK.

The commercial introduction of Portland cement in the United States has been followed by markedly increasing demand. So rapid have been the advances, and so substantial, that numbers of scientific men are beginning to call this the cement age. Not only foundations above and below water are made of cement, but whole superstructures, including bridges, and some of our strongest and most substantial railroad bridges. The sidewalks made of it are called artificial stone, and so the street crossings and gutters. Various tests are to the effect that the longer good cement structures are in use, the stronger they become, until a maximum of strength is reached excelling many kinds of natural building stone, and sometimes better than iron or steel. Many millions of dollars are invested in cement manufacturing in our state, and many millions more could be profitably used, if the known area of cement rock were enlarged. Now the work is confined, or nearly so, to the counties

of Allegheny, Columbia, Lehigh and Northampton, with one large plant in Lawrence county. The latter secure their natural product from two or three different sources, and by judicious, skillful mixing obtain the desired result. This could well be done in other parts of Pennsylvania.

The constituents for a commercial Portland cement are: Lime, from 60 to 64 per cent., silica, 20 to 24 per cent., alumina, 6 to 10 per cent., iron oxide, 3 to 5 per cent., the oxide of magnesia from one-half of one per cent. to not exceeding 3½ per cent., and sulphuric oxide to not exceeding 2½ per cent.

There are many limestone deposits in the State containing more than 60 per cent. lime, whereby the skillful mixing of pure silica sand or sand rock, and the addition of one or two other constituents, a perfectly desirable Portland compound could be had. This is notably so in Blair, Bucks, Carbon, Centre, Clinton, Columbia, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Lancaster, Monroe, Montgomery, Northumberland, Schuylkill, Union and York counties. If a bulletin were published of the localities of the limestones in those counties, together with analyses, and full descriptions of what are essential to make complete the component parts of the best cements, numerous mammoth plants would spring up as by magic to add much to our already great industrial wealth.

SALT AND BROMINE.

One year ago attention was called to the annually decreasing salt production of Pennsylvania, and to the possibility of extracting it at a profit from brine in 38 of our counties. Also to the high order of bromine found in Pennsylvania salt, particularly from the salt water of the deeper wells west and northwest of the Allegheny Mountains. The publishing of the report has not, thus far, led to increased production of Pennsylvania prepared salt or bromine. Once our State sent out superior salt to as distant places as New Orleans; now very little goes beyond our borders. Indeed there is so little manufactured that very few of our citizens know there is Pennsylvania refined salt and fewer still have ever seen any. Last year, in January, bromine, extracted from Pennsylvania salt, sold at 28 cents a pound; this year it brings 48 cents per pound. The production is far behind the demand, owing to the increased consumption for medicinal uses, for treatment of gold ores in the form of bromo-cyanide, and the enlarged field for potassium bromide. It seems somewhat odd to one who has studied the subject carefully that the old, deep-drilled wells are not utilized for the manufacture of salt and bromine in such counties as Cambria, Clarion, Crawford, Elk, Erie, Fayette, Forest, Somerset and Westmoreland. The increased market for bromine alone should spur to action; and we ought not to allow our sister states Michigan, Ohio and West Virginia to completely monopolize so important an industry.

RADIUM.

Partly due to the wide-spread interest in the discovery of the element, radium, some search has been made in our State for radium-bearing minerals. Two counties produce them, Adams and Schuyl-

kill, the first in the form of gummite and uraninite, or pitchblende, and the latter as gummite and uranophane. Radio-activity has been noticed in some of the spring waters, but much more investigation will be necessary before a full report can be made. Radium possesses a double interest now, since it has been determined by Sir Wm. Ramsey, of London, and others, that it can be gradually—in part at least—transmuted into another element known as helium. This opens a wide door for investigation whether lead can be changed to zinc, iron to copper, and silver to gold; or the old alchemist theory revived after centuries of slumber and sleep.

CARBORUNDUM.

The gigantic electric power at Niagara Falls, N. Y., is doing grand work with the mineral products of Pennsylvania. Some of our bituminous coal is first coked here, giving employment to many people, and then shipped to Niagara. Possibly in the same freight train there will be several cars loaded with our best silica sand from Mifflin, or Huntingdon or Indiana or other counties. The coke and the sand are properly mixed together at their destination, and, *presto!* under the magic influence of the electric current they are turned into a blackish, or bluish and peacock-colored substance, chemically known as carbide or silicon, and commercially sold as carborundum, the best abrasive known, far excelling in utility and usefulness the world-wide famed emery of Greece or Asia Minor.

ARTIFICIAL GRAPHITE.

Some of our cast-off coal, too hard for fuel, is sent to Niagara Falls, and again the magic play of that wonderful power, electricity; and there is returned to us an artificial graphite better for crucibles, and better for the arc light, than any natural product known.

OTHER WONDERS.

We take some of the sand found on the crests of a thousand hills or mountains of our Commonwealth, ship that to the Falls; another charge of electricity, with thousands of voltage in the power, thousands of amperes in the intensity of the current, thousands of ohms in resistance, and thousands of watts of energy; and, lo! there is returned to us the metal Siloxicon, as white as pure silver, as durable as the ages, and with a heat resistance of 7,000 degrees, Fahrenheit, or 1,000 degrees more than was believed only ten years ago would produce perfect combustion.

Then we ship there a carload, say, of our cheapest clays from one of our least prized deposits. Again the electrical manipulation takes place, and there is sent back to us a bluish-gray metal better suited for cooking utensils than iron or copper, or any other substance; and also for a thousand other different uses. The modest name of this newly discovered metal is "Egyptianized Clay." It should not be mistaken for aluminum, or aluminium, though it somewhat resembles it; for it is much lower in price, and can be used in various ways where aluminum could not possibly compete with it.

And so could be mentioned many other of the mineral products of our mighty Commonwealth; but time will not permit. Minerals we shunned a few years ago, we now seek; and minerals that had some values then, now have many-fold more.

The CHAIR: You have heard this most excellent report. What disposition will you make of it?

On motion, the report was received and placed on file.

The CHAIR: Are there any remarks on the report, or is it your pleasure to discuss it later?

MR. RODGERS: I think it would be right and proper to pass on with the program and then discuss these papers as a whole, if we have time, in order that we may get to hear everything that is prepared for the day's program.

Mr. H. G. McGowan, Chairman of Committee on Fertilizers, made the following report:

REPORT OF THE COMMITTEE ON FERTILIZERS.

BY H. G. MCGOWAN, *Chairman.*

Year after year commercial fertilizers in Pennsylvania are being used in increased quantities. The one element alone (nitrogen) is being consumed at the rate of 1,500,000 pounds in a single year. The element most largely used is phosphoric acid. Barnyard manure is more deficient in this particular than any other, hence, nearly all brands of fertilizers put upon the market, contains large percentages of phosphoric acid. America, outside of Germany, is the largest consumer of potash.

Potash is a very necessary element in all fertilizers and shows its effect upon land and crops when used. The intelligent use of fertilizers is becoming year after year better understood, yet there is great room for much improvement along this line. Entirely too much money is spent uselessly by many farmers in purchasing fertilizers. More correct figuring should be used, when thousands of dollars can be saved and used for other improvements on the farm.

For an illustration: A man who was a graduate of a Normal school in one of our counties in this State sent for an agent to come and see him, as he wanted to contract for two carloads of fertilizer. The agent went to the place, met the farmer, who was presently asked what kind of goods he desired to purchase. He replied that last season he bought eighteen dollar goods. He was asked what he meant by $18.00 goods, when he replied, that was what he paid for it and he bought it right too. He was next asked to please quote the analysis, but this he could not do. An empty bag was

sent for which revealed the fact that the $18.00 goods represented 8 per cent. phosphoric acid and 2 per cent. potash, a fertilizer not worth over $11.00 or $12.00 on the market. This man was paying $6.00 per ton more than he should actually pay or more than the actual value of the fertilizer.

This conclusively shows that the analysis is the only safeguard to depend upon. This is only one instance which came to light, and is a fact. Hence, farmers must get down to a reckoning system of figuring out the worth of a fertilizer, or give good money away without getting anything for it. No business outside of farming could stand such business methods.

Our present law compels every manufacturer to stamp upon the outside of the bag just what it contains inside. Now all ingredients, such as nitrogen, phosphoric acid and potash have their values placed upon them and by a little calculation upon the part of every farmer thousands of dollars can be saved. The present law might, however, be so amended compelling the manufacturer (in addition to the markings on the bag), state the source from which he obtains the elements nitrogen acid and potash. The farmer by this, who studies his soil and the needs of his crops, can use fertilizer more intelligently.

In one of the northern counties in our State, a gentleman writes that the use of fertilizer is rapidly increasing. He further says that much is being used indiscriminately or without reference to crop or soil requirements. Quite a number of farmers are adopting home mixing. He further adds that the demand for raw material is increasing and that home mixing is being more and more practiced each year. Some farmers are beginning to understand further that fertilizer, as a substitute for manure, ought to be applied in amounts of equal value with the manure, the place of which they take and that $5.00 worth of fertilizer per acre can do as much good as $15.00 worth of manure. Also more farmers are adopting the lesson of getting the nitrogen (which is the most expensive element), from the air by the growing of leguminous crops and thus save buying it through the fertilizer bag.

The more that farmers sell from their farms the more deficient their land becomes in fertility. One hundred bushels of wheat sold from the farm, means $25.00 worth of fertilizer hauled away. One hundred bushels of corn sold, means $1,600 worth of fertilizer gone. One hundred bushels of oats hauled away means $12.00 worth of fertility gone; likewise with hay and straw that is sold from off the farm. Therefore if this fertility be hauled away, it must be returned or the land will become exhausted. We have a nice bank account, but if we continue checking it out and do not deposit we will soon find to our sorrow that we will grow rapidly poor. "Feed your land properly and it will feed you." Again, a ton of butter carries away only 40 to 50 cents worth of fertility from the farm, while a ton of milk sold carries away $2.00, or a 2,000 pound ox sold will take away $10.00 worth of fertility.

Considering how easily the fertility drifts away from our farms, it certainly behooves us to be more careful of that great commodity, which we most carelessly look after, and that is farmyard manure. It is said, upon good authority, that only 1-3 of the real value of barn-

yard manure is saved; that is, where a farmer produces $300.00 worth of manure (and many farms do this), that only $100.00 of it is actually saved. The other $200.00 worth is lost by leaching and injudicious handling. We, therefore, emphasize the necessity of hauling out the farmyard manure daily, if possible. If Farmers' Institutes do no more in one season than arouse our farmers to a more painstaking care of the manure produced on their farms, the work of the Institute will be amply repaid and accomplish sufficient for the tiller of the soil in this Commonwealth.

We note, in order to bring about more and better care of farmyard manure, that in Germany premiums are offered for the best system of caring for farm manures. Our agricultural societies could do nothing more commendable than to take up this matter, offer premiums for the best method of taking care of this valuable fertility. As a suggestion, with the knowledge that we have now, no better method is in vogue than to haul out farm manure as fast as it is made.

Stables should be properly arranged for taking care of the liquid, the most valuable part of the manure. A ton of farm manure contains 11.9 lbs. ammonia, 6.4 lbs. acid, 8.6 lbs. potash. In our Western states the use of commericial fertilizers is vastly increasing.

When Western New York was first settled the farmers hauled the manure into the Genesee River to get rid of it, but now they husband every pound of it and use large quantities of commercial fertilizer in addition.

Rome began to decay when her sewerage system was completed, which drained into the Mediterranean Sea the plant food that should have gone back on the land. This is also true of our American cities. They are draining every year, month, week, day and hour vast stores of fertilizer that should be conserved and somehow returned to the soil. In some instances manure from the cities is scarcely worth the hauling from the fact that all the liquid is gone into sewers, which is its most valuable part.

In this brief report we would emphasize the necessity of farmers, who use commercial fertilizers, to buy in club lots. Communities should have local organizations; but, if these organizations do not exist, they could at the same time buy in bulk together, and thus save each farmer at least from $4.00 to $6.00 per ton. So long as we grow crops we need fertility, and fertilizers can generally be depended upon to supply us with this plant food, which we must have, when other sources of plant food from the farm are defficient.

We would drop a word of commendation to the Department of Agriculture for her diligent work in having all manufacturers come to the front and show by analysis just what they are giving out in fertility through the fertilizer bag or sack. No act of legislation is of more benefit to our farmers, if the farmer only would acquaint himself better along this line.

Profits on the farm are not as quickly secured as in some other industries, but the farm is a sure source of income. Though profits of some years may be but little, yet the gains are cumulative, the fertility added to the soil being a future store from which to draw.

In some occupations, panics or business depressions bring ruin

upon the merchant or the manufacturer, but the farm remains as a source of revenue for its owner, and that which may have been years accumulating is ready and available at any time, the fertility of the land being a bank upon which the farmer can draw.

The CHAIR: You have heard the report of your Committee. What is your pleasure?

MR. STOUT: I want to call your attention to an error. I think Mr. McGowan stated eleven per cent. of nitrogen in the common manure; I think he meant to say eleven pounds instead of eleven per cent.

MR. McGOWAN: That is right. Eleven per cent. would be 220 pounds; that wouldn't do.

MR. HERR. I move that the report be received and placed on file. The motion being seconded, it was agreed to.

The CHAIR: Have you any remarks to make on the reports that have been received?

MR. NELSON: I would like to call the attention of members of the Board who are present to that honey-comb full of foul brood that Prof. Surface laid down there. He had it passed around so that we might have an opportunity to examine it. Nothing has been said yet about it, and a great many people do not know that foul brood only attacks young bees between the age of three and twenty-one days. By examining that comb you will see how the disease is so contagious. The honey is healthy enough for a live bee to eat, provided they do not feed it to the young bees within the ages mentioned. The germs of the bacteria only attack the bee in its larvae stage. The young bee dies in the cell, and cannot be removed by the old bee.

The SECRETARY: I think you have all heard the story of the man out in Illinois who was devoted to raising pigs, and some one asked him why he raised so many hogs, and he said that he did that in order that he might sell the pork, with which to buy more land on which to raise more corn with which to feed more hogs with which to buy more land, and so on everlastingly. I think we are all interested in the swine-growing proposition, though we don't do nearly so much of it as is done in the State of Illinois. We have the pleasure and good fortune of having a citizen of the State of Illinois with us as a visitor, therefore, I move you that Mr. Lovejoy, of Illinois, have the privileges of the floor, and that we extend to him an invitation to talk to us along any line that may suggest itself to his own mind.

The motion being seconded, it was agreed to.

Mr. Lovejoy addressed the Board as follows:

STATE FAIRS.

Our State Board of Agriculture is a very differently organized body from this. Our Board is non-political and its membership comes from every Congressional District in the State. The mem-

bership is based upon the county fairs. If a county has a fair, it can send three delegates to our State Agricultural Convention. That is the way our State Board of Agriculture is organized. It has nothing to do particularly with politics. There are State and County Institutes, provisions made for the keeping of statistics and an annual State Fair. We have, as perhaps some of you know, one of the greatest State fair grounds in the world. Our State fair for about forty-five years was migratory. It was what we called, on wheels; but in 1894, it was located permanently at our capital. A great many other cities wanted the fair and made bids for it. Springfield being the capital, we finally located there. The city of Springfield gave the Board 167 acres of land adjoining the city limits, and agreed to give them $50,000 in cash, and pave the street from the State House to the Fair Grounds, making a boulevard all the way. We finally accepted their proposition, and our State Legislature enacted the requisite legislation.

When we first located this fair at Springfield, I think we had about $90,000 in the treasury, a part of which had been saved from holding fairs, etc., and we took hold and went before the Legislature and asked for $65,000 that year to build ourselves a permanent building, which was called an Exposition Building, and built in the very latest and best style, everything first-class.

Twelve years ago when we elected a Democratic Governor, Mr. Altgelt, about the first thing he did was to inform us that he was going to abolish the State Board of Agriculture. We said to him that he had better look up the law. He looked up the law and found he had nothing to do with it, and he came to us and said that he found that the State Board of Agriculture of Illinois didn't have to report to God, man or the devil.

The time came when we wanted some more buildings, and we drew up a bill for $225,000 for permanent improvements on this fair ground. We had the specifications and plans all prepared, showing what buildings we wanted built when we took the matter before the Legislature. That year we wanted a machinery hall, 500 feet by 200 feet, and we wanted a grand-stand that would seat 7,000 and some odd, and we wanted, what would be called an administration building, and an agricultural building. We got the $225,000 appropriated by the Legislature and built those buildings. The machinery hall cost $65,000; our agricultural building about $80,000; our grand-stand $35,000, and we put the rest of it in barns and stables, and so it went on year after year, asking for certain appropriations and always getting them.

Every building, except the stables, is built of brick and steel and stone. Every building on the fair-ground, even to the swine building, has every convenience. $50,000 has been invested in horse and cattle barns; and take it all in all, we have very beautiful fair grounds. Our fair is self-sustaining; but we get about $5,000 every two years to keep the grounds in repair.

The grounds are used by Springfield, the capital city, as a park, and it makes a very nice place to take visitors coming from other states. We also have a western fair circuit that takes in the states of Iowa, Missouri, Kansas, Nebraska and Minnesota, and an eastern circuit that starts at Syracuse. And then we have what we

call the round-up, in which the people of the East and West all meet at Illinois, and the fellow that goes from Illinois with the blue ribbon is considered pretty near the best fellow out that year. We pay about $45,000 in cash premiums each year. We have always paid that on Friday afternoon for fifty-four years, and no one ever went away from the fair that did not have his premium money. I was a member of our Board for eight years and then retired because the Governor gave me a job which had a little more money in it.

MR. HUTCHISON: The question of a State Fair has been agitated by the Breeders' Association, and they have a bill which they stated they would have here this morning, to have read before the State Board and get the opinion of the members, but Mr. Norton has not come in yet, but some time this afternoon he will present it before the Board and have it read and have your opinion in regard to it.

A member spoke of the fact that the State of New York pays all premiums, while in the State of Pennsylvania only $100.00 is supplied towards fair expenses every other year.

The SECRETARY: I understand that Dr. Armsby has some matter that he would like to present to the Board, and if there is no objection, I would like him to have the floor now.

DR. ARMSBY: I would like to call attention to the fact that a conference of the Allied Organizations of Agriculture in Pennsylvania has been called to meet this afternoon. I would request or suggest that the Board appoint such a number of delegates as they wish to represent them at this conference.

I would like also, Mr. President, if I am in order, to introduce a resolution regarding the so-called Adams bill which most all of you know about, a bill pending now in Congress to increase the appropriation for experiment stations.

Dr. Armsby presented and read the following resolution:

Whereas, The investigations of the State Experiment Stations have been of incalculable value to the agriculture of the United States; and

Whereas, The present appropriation by the United States to these stations is insufficient to enable them to adequately perform the varied work demanded by their constituencies, while the appropriations by the several states are largely consumed in providing the necessary land, buildings and equipment; therefore,

Resolved, That the State Board of Agriculture hereby heartily endorses the bill (H. R. No. 14098) introduced in Congress by the Hon. H. C. Adams of Wisconsin, and now pending, to increase the national appropriation to these institutions, and requests the Senators and Representatives from this State to use every effort to secure its passage during the present session of Congress.

Resolved, That the Secretary be instructed to forward a copy of these resolutions to Mr. Adams and to each Senator and Representative from Pennsylvania.

DR. ARMSBY: The purpose of the bill is to increase the national appropriation which is now $15,000, to $20,000, and increasing it by $2,000 annually thereafter for five years until the total reaches $30,000; that is, doubling the appropriation in five years. I do not know that it is necessary to add very much to this statement. You all know what the experiment stations are.

The resolution was adopted.

The CHAIR: It is suggested that the Board appoint three persons to assist in promoting the objects of this resolution.

The SECRETARY: If there is no objection, the Chair might just make the appointments.

The CHAIR: I will appoint Messrs. Sexton, Chubbuck and Blyholder.

MR. SEXTON: I think I am already a member of that organization.

DR. ARMSBY: This is practically a re-appointment.

The CHAIR: This is your re-appointment.

MR. J. W. BUCKHOUT: Mr. Chairman, I am here as the Deputy Secretary of the Lancaster County Poultry Association, and I have a resolution to offer here that is somewhat in line with those offered already.

Mr. Buckhout read his resolution which is as follows:

Whereas, The vast poultry interests of the State of Pennsylvania have received no recognition from the State; therefore, be it

Resolved, By the State Board of Agriculture, in annual convention assembled, that we do endorse the following resolution:

Resolved, That the Legislature be requested to appropriate the sum of not less than five thousand dollars ($5,000.00) for the purpose of improving the poultry industry of the State;

One half of this amount to be distributed *pro rata* among the various Poultry Associations that have held poultry shows the past year, for the purpose of increasing their premiums and inducements to exhibitors at their next shows;

The remaining half of the appropriation to be used to hold Poultry Institutes similar to the Farmers' Institutes, at various points in the State, and pay expenses of competent speakers to lecture at these institutes.

The Pennsylvania State Poultry Association.
The Pittsburg Fanciers' Club.
The Allegheny Fanciers' Club.
The Sanatoga and Schuylkill Valley Poultry Association.
The Blandon Poultry and Pigeon Association.
The Lancaster County Poultry and Pigeon Association.

J. W. BUCKHOUT, Secretary.

The CHAIR: You have heard the resolution. What disposition will you make of it?

COL. DEMMING: Mr. Chairman, with all due respect to the gentleman from Lancaster, would it not be the better plan to act upon the resolution of Dr. Armsby first and then take this up afterwards?

The CHAIR: We have already adopted that and appointed a committee. I think this should be referred to the Legislative Committee.

Mr. McGowan presented resolutions as follows:

Resolved, That the State Board of Agriculture hereby records its appreciation of the recognition accorded to the agricultural interests of the State by the last Legislature in the appropriation of $100,000 to begin the erection, at the Pennsylvania State College, of an agricultural building, with the proviso that the total cost shall not exceed $250,000;

Resolved, That we request and urge the present Legislature to provide for the immediate completion of the building by the appropriation of the remaining $150,000, in order that all branches of agricultural education at the State College may be as well-housed as is the dairy work in the portion of the building now completed;

Resolved, That this organization appreciates the work done for agricultural education in the past under very favorable conditions by the Pennsylvania State College, and that it requests from the Legislatnre a liberal appropriation for the maintenance of the various agricultural courses, in order that the equipment already provided may be utilized to the fullest possible extent;

Resolved, That in view of the importance of scientific investigation to the development of the agricultural interests of the State, and of the fact that in the past scarcely any State aid has been given to the Agricultural Experiment Station, the State Board of Agriculture is heartily in favor of a liberal appropriation by the State for the maintenance and enlargement of the current work of the Station;

Resolved, That the Secretary be instructed to send a copy of these resolutions to the Secretary of the Allied Agricultural Organizations, and that the Legislative Committee be instructed to co-operate with that organization in securing the desired legislation.

The Chair called attention to the fact that Deputy Secretary Martin was now present.

DEPUTY SECRETARY MARTIN: Mr. Chairman and Members of the Board: I have no personal preference in the selection of a place for holding our annual meeting further, than that I think we should look to the accommodation, the reasonable accommodation of those who are in attendance; hotel accommodations I refer to, and the centralizing of this location as to railroads. You are aware, my friends, that these meetings have grown in importance and attendance, and the expenses attending them has increased on this account very much, and it is of the first importance that the location be selected as to lines of railroad as well as to hotel accommodations.

It was in my mind, that if the new Capitol were sufficiently ad-

vanced in its work, that Harrisburg would be a good point to hold our next meeting, as the lobby in the Department of Agriculture would be of sufficient size to accommodate this meeting, and we have never yet held our Normal or "Round-up" meeting at Harrisburg; and sometime, either at our next meeting or the one following, in my judgment, we ought to hold at Harrisburg.

The matter is entirely in your hands; and whatever place, in your wisdom, you may select will meet with my hearty approval. I will only add, that we held a very successful institute meeting at State College and Bellefonte in the month of October, and the hotel accommodations were measurably—only measurably good. I learned there that there were over a hundred cots placed in the hotels at Bellefonte, and men coming from a distance were compelled to rest upon those cots instead of comfortable beds. Now, gentlemen, that is not right. Pennsylvania has centers of population, with hotels sufficient to accommodate every gentleman who attends these meetings with comfortable beds, and we do object to meeting in any place where they have not adequate accommodations, when there are cities like Harrisburg, Lancaster, York, Philadelphia, Pittsburg and Newcastle, not to mention others, that have ample accommodations. We ought to look to that matter in selecting a place. I only throw out these suggestions for your consideration, and whatever place you may select I shall be entirely satisfied.

MR. HERR: Mr. Chairman, I fully agree with what Secretary Martin has said in regard to the place of meeting. He mentioned the economy of meeting at a central place, where we would be subject to the least expense; and I know of no place better adapted to meet the requirements outlined by him than Lock Haven. I know we were entertained there with an attendance of a thousand people —a good many more than will be in attendance at the annual round-up meeting—and all were perfectly satisfied with the accommodations. Our people would be very glad to welcome you there. Another point is, Lock Haven is not very far from the Pennsylvania State College, and the Professors there can meet us at very little expense and with less loss of their time than any other place in the State, outside of Bellefonte. I, therefore, place in nomination Lock Haven.

The CHAIR: Lock Haven has been named. Are there any other nominations?

MR. FENSTEMAKER: Dr. Thayer made a pretty good suggestion to me, and I wish he might be accorded the privilege of stating his views on this subject.

DR. THAYER: I do not want to impose my suggestion upon this Board. I only have expressed a wish that we might hold Inter-State Normals, meeting with the New York State Society that meets about the same time that we do, and so each alternate year accommodate each other. Get some people from outside, and give some of the Pennsylvania people to the outside people. I think that would be an admirable arrangement, and then provide for more days for

your meeting. That was the suggestion that I made to my friend, and I believe, from my conversation with others, it would be a general desire, provided it could be reasonably well carried out.

The CHAIR: Are there any other remarks? Or any other places to be presented?

MR. TEMPLE: I would like to invite the Board to meet with us at West Chester. I do not think there has been a meeting of the Board or Round-up held there for fifteen or twenty years. There was one held there in October when Secretary Edge was Secretary of the State Board. We have the Philadelphia and Reading and Pennsylvania Railroads running there, and ample hotel accommodations.

The CHAIR: West Chester has been nominated.

MR. STOUT: I would like to suggest Lebanon as the place of meeting.

The CHAIR: Lebanon has been named. Are there any others? If not, we will proceed to take a vote. What is your pleasure in voting? Will you have the roll called and have the members name the place?

MR. HERR: I move that the roll be called and that each one respond to the place of his choice.

The SECRETARY: We will call the roll of counties, if it is so desired.

On motion this was agreed to, and the Secretary proceeded to call the roll of counties.

The SECRETARY: I am prepared to announce the vote. Nineteen for West Chester, six for Lock Haven, four for Lebanon and one for Harrisburg.

The CHAIR: The majority having decided on West Chester as the next place of meeting, it will be so recorded, and the time will be fixed by Deputy Secretary Martin.

Mr. Temple extended his thanks for the selection of West Chester as the next place of meeting.

The CHAIR: We shall now be favored with the address of Prof. Voorhees, on the "Composition and Use of Home Manures."

PROF. VOORHEES: Mr. Chairman, and Members of the State Board of Agriculture: I never discuss this subject without thinking of a story that was told by a friend of mine who was to speak upon the subject in a country place, and the "master of ceremonies," being a rather pompous sort of individual, wanting to make an impressive introduction, stepped forward and said: "I have very great pleasure in introducing Mr. —— this evening, who will talk to you upon the subject of manure, and I know the man well enough to know that he is full of his subject."

Now I believe that a man should be full of his subject in appearing before an audience, and a man that is full of his subject generally knows something about it; but on a particular subject like this I would prefer to be full of something else. In order that the matter that I have to present to you may be intelligently presented, contrary to my usual custom, I have written out the matter that I have prepared, in the hope that we may have some considerable discussion upon the points presented.

Mr. Voorhees read his paper as follows:

THE COMPOSITION AND USE OF HOME MANURES.

BY PROF. E. B. VOORHEES, *New Brunswick, N. J.*

There is probably no other one question so important to the farmers of America as the question of the handling and use of farm manure, for notwithstanding certain statements that have been made, and presumably from authoritative sources, that the fertility of a soil is dependent more upon the solutions that exist in it, than on its content of nitrogen, phosphoric acid and potash, the bulk of the evidence is still in favor of the fact that the measure of potential fertility of any soil is its content of nitrogen, phosphoric acid and potash, and that the actual fertility depends upon the handling of these constituents, as they exist in soils, and as they may be applied. The successful production of crops depends upon the handling of these constituent elements more than upon any other one thing, particularly in humid districts. It will be interesting, I think, to give some idea of the constituent elements that are removed from our soils, and the gradual deterioration in crop-producing power, the amounts of constituents that are carried away from our farms in our leading crops. In 1903, there was produced in this country, in round numbers:

63,000,000 tons of corn.
61,000,000 tons of hay.
19,000,000 tons of wheat.
11,500,000 tons of oats.
822,000 tons of rye.
*800,000 tons of cottonseed meal.
764,000 tons of flaxseed.
356,000 tons of buckwheat.
329,500 tons of barley.

Each ton of these various crops removed more or less of the fertility constituents, nitrogen, phosphoric acid and potash, ranging from 140, 55 and 40 pounds per ton, respectively, for cottonseed meal, to 30, 10 and 4 pounds per ton, respectively, for buckwheat. With-

*Estimated.

out going into further detail, it is sufficient to say, that in the $2,000,000,000 bushels, or over, of corn, there was contained:

Nitrogen, equivalent to 6,000,000 tons of nitrate of soda.
Phosphoric acid, equivalent to 2,738,000 tons of acid phosphate.
Potash, equivalent to 452,000 tons of muriate of potash.

In the 61,000,000 tons of hay there was contained:

Nitrogen, equivalent to 3,955,000 tons of nitrate of soda.
Phosphoric acid, equivalent to 1,752,000 tons of acid phosphate.
Potash, equivalent to 1,471,000 tons of muriate of potash, and in the other crops, so large an amount of the constituents as to make the total removed from the soil in these crops in a single year equivalent to the:

Nitrogen contained in 14,186,000 tons of nitrate of soda.
Phosphoric acid contained in 6,902,000 tons of acid phosphate.
Potash contained in 2,260,000 tons of muriate of potash.

It will be observed that in this calculation, with the exception of hay, the constituents removed represent only those in the grain or seed; those contained in the straw and stalks are assumed to remain on the farm; and further, that the crops of tobacco, sugar-cane, sugar beets, potatoes, pastures, and all fruits and vegetables are not included. These figures are stupendous; their true significance can hardly be comprehended even by those who do appreciate and can foresee and safely predict the ultimate result of this annual and continuous removal of plant-food under present methods of practice.

The constituents contained in the stalks and straw, accompanying these crops, and those that remained on the farm from the feeding of part of the grains, are not sufficient, as is abundantly evident from careful observation, to maintain the original fertility of the soil, let alone its increase. It does not follow that the fertility of our soils would be maintained at their former standard, even though as much as possible of the constituents in these crops were returned, as our methods of practice in many parts of the country, at least, are such as to cause not only a loss of the constituents themselves, but a loss of physical and chemical character, which makes a unit of the constituents less efficient than under better conditions of practice.

Some idea of the importance of these figures may, however, be obtained when we place alongside of them in similar manner the amounts of constituents that are returned to the soil in the form of commercial fertilizers. In 1899, according to the United States census, the farmers of the country paid $54,780,000 for about 2,700,000 tons of commercial fertilizers. Assuming an average composition of:

Nitrogen,	2 per cent.
Phosphoric acid,	8 per cent.
Potash,	4 per cent.

there was contained in these fertilizers, nitrogen, equivalent to that contained in 253,500 tons of nitrate of soda, phosphoric acid, equivalent to that contained in 1,380,000 tons of acid phosphate, and potash, equivalent to that contained in 216,000 tons of muriate of potash. Hence the total amount of constituents supplied by the fertilizers

returned, is equivalent to but 2 per cent. of nitrogen, 20 per cent. of phosphoric acid and less than 10 per cent. of the potash removed in the crops mentioned.

It seems to me, therefore, that the importance of the question of the use of fertility constituents, is clearly established, and the bearing of the composition and use of farm manures bears directly upon this point, or upon the immediate and prospective fertility of our soils.

One difficulty encountered in the discussion of a subject of this sort, is that we are dealing with a product that is extremely variable. Farm manure is not uniform, either in its composition or in reference to the organic matter contained in it, or in its proportion of constituent elements. While variations in the original composition of the product occur and are due to kind of animal, age of animal, use of animal, kind of feed, and amount of litter used, though in any case it is worthy of our attention, because it does contain those substances which are liable directly or indirectly to improve our soils.

Another point that is worthy of consideration in connection with our study of farm manures is, that the constituents in them cannot be compared with those contained in the various commercial supplies, because associated with the nitrogen, phosphoric acid and potash, in manures, there is more or less of organic vegetable matter, which has a very important modifying influence, both upon the constituents in the soil, to which it is applied, as well as to the constituents contained in the manure itself. It very frequently happens, that the manurial effect of certain definite amounts of constituents in a product of this sort, would be greater than can be accounted for by the effect of the constituents themselves, and from this standpoint alone values are considerable, though because these effects are again modified by kind of soil, kind of crop, kind of season, etc., they are indefinite rather than definite amounts.

In order, however, that we may have some definite proposition to discuss, we must have either positive or assumed data in reference to the yield of manure from an animal, and its composition. Experiments conducted at the New Jersey Station, show that a cow of 1,000 pounds live-weight, well-fed, will produce, on the average, 12.8 tons of manure per year, and that the composition of this manure, free from litter, averages:

Nitrogen,	0.457 per cent.
Phosphoric acid,	0.300 per cent.
Potash,	0.348 per cent.

There are contained, therefore, in the product of each cow:

Nitrogen,	117 lbs.
Phosphoric acid,	77 lbs.
Potash,	89 lbs.

What this means in a large way, can be made clear by applying the figures to the number of milk cows that are contained in any one state. The State of Pennsylvania, for example, the statistics show 1,055,071 cows. The constituents contained in the manure,

assuming the average composition above given, of these cows, would be equivalent to the

Nitrogen contained in 398,204 tons of nitrate of soda.
Phosphoric acid contained in 290,000 tons of acid phosphate.
Potash contained in 93,901 tons of muriate of potash.

If to these amounts were added the constituents contained in the manures from 900,000 other cattle, 900,000 sheep, 600,000 horses and 1,000,000 hogs, there would be, in round numbers, 750,000 tons of nitrate of soda, and the proportionate amounts of the other constituents, or more than twice as much nitrogen as is now purchased in the fertilizers bought. Or, in the State of Pennsylvania alone, the constituents contained in the manures of the farm animals, would, if existing in commercial forms, be worth more than is now paid by the entire United States for the constituents in commercial fertilizer. Obviously it is a question of importance. Manure is one of the most valuable assets of the farm, yet because of the character and composition of manures, the chances are that even under the best methods of handling and use, but a small proportion of the nitrogen at least is recovered in future crops. In other words, the question of the utilization of the constituents in manures is twofold: First, we have the losses that are liable to occur previous to the application of the manure upon the land; and second, the losses that result from the lower availability of the constituents in the residues of manures that have been badly handled. The losses that may occur previous to applying to the land, are due to two causes, first, fermentation, which results in the loss of nitrogen only and which may be very considerable, and second, the losses due to leaching, which affects all of the constituents, nitrogen, phosphoric acid and potash. In both these instances, the greatest loss is liable to fall upon the constituent nitrogen, because when in combination with organic substances, it will escape when changes take place, which sets it free from that substance, and in the case of the liquid portion of manures, the leaching will carry away the nitrogen that is in such combination as to be in liquid form. It is because of the lack of knowledge and the lack of appreciation of the possible loss that may take place in these directions, that accounts in part at least for the poor methods of management that are observed throughout this and other states.

We speak of the wastes of food value that are liable to occur when hay is subjected to rain, or when corn-stalks are left in the field unprotected from the rains and winds, and progressive farmers are particularly careful to prevent losses from these sources, and yet they will allow their manures to lie in the open yard to ferment, and be subjected to all of the losses that will occur through frequent saturation with water. The first loss can be seen and felt, as it were, while the other is obscure from the sight, though actually much greater in the aggregate than the other. Many experiments have been conducted in this and other countries, both in reference to the methods of preserving manure, as well as investigations concerning their best use, and naturally the first point which is of the greatest interest, is that which has to do with the preservation of the original constituents, and necessarily in order that these efforts may be properly conducted, it is necessary that we shall have definite

knowledge concerning the possibilities of loss of the constituents from manures.

In experiments that were begun at the New Jersey Station, in 1898, it was possible to study two phases of this question, first, as to the losses that are liable to occur by exposing manures to the action of the rains, making the conditions similar to those which would occur were the manures left in the open yard. Data have been tabulated from year to year, and up to the present time, five years' records are available for study. It was shown by careful chemical control, that in the solid portion of the manure, only the loss of organic matter was 37.6 per cent., while in the solid and liquid combined, it was 40.7 per cent. The loss of nitrogen in the solid was 38.4 per cent., and in the solid and liquid manure 52.6 per cent.; the loss of phosphoric acid in the solid manure was 46.8 per cent., and of the solid and liquid portion, 48 per cent.; the loss of potash in the solid manure was 44.4 per cent., and of the solid and liquid manure 57.6 per cent. Or, in other words, of the total product, for every 100 pounds each of nitrogen, phosphoric acid and potash in the original manure, 52.6 pounds of nitrogen, 48 pounds of phosphoric acid and 57.6 pounds of potash were lost by leaching during an average of about 100 days. There may, of course, have been a slight loss from fermentation; but inasmuch as the manures were exposed from about the first of February to the middle of May, the loss from this source could not have been serious, as the temperature was too low to permit such activities. It may be said, on the other hand, that the losses from the solid manure were very much less than from the solid and liquid manure, and that, therefore, comparisons on that basis would be more in accordance with the actual losses that occur. This argument has been used, and yet when it is remembered that more than one-half of the nitrogen and potash of the total manure product is contained in the liquid portion, if this portion were not considered at all, then the losses would be multiplied by just that amount. However, in order that we may have some definite and practical idea of what these individual losses mean, if they are applied in the aggregate, I have calculated the amounts possible to lose in this way for the cows in Pennsylvania, and find that if these maximum losses were incurred, the nitrogen would be equivalent to 209,455 tons of nitrate of soda, 139,200 tons of acid phosphate and 54,086 tons of muriate of potash. These would cost, if purchased in this form, $14,157,710.

It is not to be understood by this that I say that these constituents are lost in this proportion, or that they would be worth as much as the constituents that are in the commercial fertilizers. Nevertheless, I do believe, and experimental data bear me out, that the constituents in manures, particularly nitrogen, may be, on the average, quite as useful and return the farm quite as large an increase per unit, particularly the nitrogen, as those bought in commercial fertilizers. If the farmers do not believe this, and they are allowing the constituent elements of their manures to be lost, the best way to prove the fact to their own satisfaction, is to stop the losses upon their farms.

The practical question that may be asked in reference to this matter is, how is the farmer to save these constituents? Experi-

ments at your own Station, show that one of the most practical methods, and one which will result in the least loss, particularly in the feeding of steers, is to keep them in box-stalls, so that the manure from day to day may be thoroughly tramped, and enough litter used to absorb all of the liquid portion. This method, as compared with the method where the manure is thrown out, though kept under cover, is very much more economical of the fertility constituents, the losses in the first case being 5.73 per cent. of nitrogen, 8.52 per cent. of phosphoric acid, and 5.57 per cent. of potash. Whereas the losses from merely allowing the manure to lie in the open yard, in heaps, on a clay floor, resulted in a loss of 34.12 per cent. nitrogen, 14.19 per cent. of phosphoric acid and 19.86 per cent. of potash; and as stated in the bulletin, the money value of the fertilizer constituents lost by the second as compared with the first method, is equivalent to $2.50 for each steer stabled for six months.

The chief point in the handling and preservation of manure, therefore, is to keep it compact and moist, which will prevent destructive fermentation, and cover it, in order to prevent the water passing through it. In many cases, particularly in reasonably level countries, the maximum quantities of the constituents are preserved, if the manures are taken from the yards and spread upon the fields, as immediately the manures are exposed to the air, and cooled, fermentation is likely to cease, and such leaching as may take place would be absorbed and fixed by the soil, and thus reducing the possible loss to a minimum.

My purpose, however, is not so much to indicate methods of use aside from the principles involved in the loss of manures, as it is to point out the possibilities of loss, and the relative effect of the nitrogen contained in manures when fresh, both in the solid and solid and liquid combined, as well as the two when leached. In the experiment previously referred to, a comparison was made of the availability of the nitrogen in these different forms, and it was so planned as to make the results secure of practical application in the field; that is the amounts were not excessive, and the crops grown were such as usually receive the manures from the farm yard. The rotation adopted was corn, oats (two years), wheat and timothy, and the results are shown in the following tabulations:

Fresh Manure.

Pounds of Nitrogen Recovered in Every 100 Pounds Applied.

	In solid.	In solid and liquid.	Ratio of solid to solid and liquid.
Corn,	7.44	22.04	1 to 2.96
Oats,	14.04	39.40	2.80
Wheat,	30.20	29.90	.....
Timothy,	18.40	13.80	—1.30

Leached Manure.

Pounds of Nitrogen Recovered in every 100 Pounds Applied.

	In solid.	In solid and liquid.	Ratio of solid to solid and liquid.
Corn,	8 40	13.80	1 to +1.64
Oats,	11.90	24.50	+2.05
Wheat,	23.70	19.40	—1.21
Timothy,	16.40	20.30	+1.24

Stated in another way, the nitrogen in the solid and liquid manure, fresh, on the average, is 48 per cent. better than in the solid manure, fresh. The nitrogen in the solid and liquid, leached, is on the average 42 per cent. better than in the solid, leached. The nitrogen in the solid, fresh, is 15.8 per cent. better than in the solid, leached, and the nitrogen in the solid and liquid, fresh, is 34.7 per cent. better than in the solid, leached.

A study of these figures, reveals some very interesting facts, particularly in reference to the differences obtained when the manures are applied to the spring crop, and when applied to crops seeded in the fall. In the case of corn, it is shown that the nitrogen in the solid and liquid manure, combined, fresh, is nearly three times as valuable as in the case of the solid manure, alone. The same is practically true in the case of the manures when applied to oats. That is, every ton or every unit of nitrogen in the solid and liquid manure, combined, is worth 2.8 times as much as that contained in the solid manure, alone. When it is remembered, that in a great many cases, animals are stabled in such a way as to lose a large proportion, at least of the liquid part of the manure, the loss falls upon the most valuable portion. These facts are also strikingly instructive in reference to the relatively high availability of the nitrogen in fresh manures, comparing very favorably with the nitrogen in commercial supplies. The comparison between the solid, alone, and the solid and liquid, combined, in the leached products, shows that while the relations are the same in a general way, they are less striking. That is, the leaching having carried away the larger proportion of the liquid parts, makes the use of a unit of nitrogen in the leached material less effective, than in the case of the fresh. Nevertheless, the combined material is per unit of nitrogen from 1.6 to 2 times as effective as in the solid portion. It was stated, that in the planning of these experiments, the amounts used were so adjusted as to compare favorably with those used in practice. That is, the measures were so adjusted as to make the application correspond with about 16 tons of good manure per acre. In the case of the spring crops, the returns showed a larger utilization of the nitrogen, particularly

in the combined solid and liquid, ranging from 22 to 39 per cent, thus causing a very large increase in the yield of crop.

In the case of the wheat and timothy, these large applications caused a very rapid growth and large development of the plants in the fall on those plots which received the solid and liquid, combined, much larger than in the case of those which received the solid only. At harvest time, however, the yields from these plots were, in the case of the wheat, smaller from the use of the more available nitrogen in the solid and liquid, than from the use of the less available nitrogen in the solid, alone, showing that the larger utilization of the nitrogen in the fall did not result in a larger crop or a larger total increase. This is explained by the fact, that the larger crop, due to the greater availability of the nitrogen, did not contribute directly to the increase of crop, because it was lost through the drying up and blowing away of the organic matter thus formed. The same was true, though not in so marked a degree, as in the case of the timothy, particularly in the use of the leached portions. These results have their practical bearing in the use of manures on these crops. In many localities, the manure made upon the farm is retained for use upon the wheat. These experiments show that a much better practice would be to use the manure upon the spring crops, rather than to hold it over, take chances upon leaching, and to apply an excuse upon fall crops; or, instead of using large application upon the fall crops, reduce the amounts to 8 or 10 tons per acre.

It is obvious, therefore, as pointed out in the beginning, that the question of manures is one of the most important that the farmer has to consider. Manure contains not only the constituent elements that are removed in the sale of our crops, but they possess large quantities of organic matter, which have an immediate bearing upon the maintenance of physical condition upon the effectiveness of the other constitutents in the soil upon the absorptive character of soils, thus making them better mediums for the circulation of water and plant-food, and for the development of useful bacteria, and that as sources of plant-food, particularly nitrogen, they be, when carefully preserved, quite as useful as many forms of the same constituents in commercial fertilizers; that because of their physical and chemical character, there is very great danger that a large loss may occur in all of the constituents unless great care is used, reaching as high as 50 per cent. of the total amounts contained; and furthermore, that the constituents that are liable to be lost are those which are the most available, and that in the case of the nitrogen, the availability of the combined liquid and solid may be three times as great as the availability of the solid, alone. There is no more important or valuable asset to the farmer, than that which is contained in his manure pile, and while all farmers realize the importance of manures, and regard them as useful, but few have so complete an understanding of their importance as to adopt a practice which will result in the minimum loss. Many farmers are engaged in the production of milk. They realize that if they are to succeed in their business, they must make very great efforts in the selection of animals, the preparation of rations, and in the handling of their product, to reduce the cost of a quart of milk. Calculations based upon the losses of constituents liable to occur in manures and the further

loss due to the less availability of the constituents remaining in the manures, do have a bearing upon the cost of a quart of milk or a pound of meat, particularly if on those farms the fertility so lost is made good by the purchase of commercial fertilizers, or of other manures. On the basis of these experiments, the increase in the cost of a hundred pounds of milk would be not less than 25 cents. That is, if the farmer made the outlay for commercial fertilizers to the extent of the losses in his manures, it would affect the cost of his milk by just this amount. This certainly is a practical matter, and one which affects not only the farmer of to-day, but must have its bearing upon the farming of the future, as a continuance of the wasteful methods of practice, which are in use upon many farms, must result in a rapid decrease in their productive values. Farmers should remember that farming, in its best sense, is merely the transformation of constituents contained in soils, and in manures, into products of a salable character, and while it is not possible by any system of farming to prevent losses of nitrogen, it is possible by careful observation of the laws that are involved to reduce these losses to a minimum, and make the farming constructive rather than destructive in character.

MR. RODGERS (in the Chair): You have heard the paper. What action will you take on it?

On motion, the paper was received and placed on file.

MR. STOUT: I think if we always add just a little bit more in the way of vegetable matter to the soil of our farms than we take off in the crops, that there will be very little deterioration in their productive qualities.

MR. BLYHOLDER: I want to state in behalf of the committee who were appointed to wait upon the Governor—we told you that we thought we would have him here to-day—we have learned that he will not arrive in the city until about the noon-hour to-day. That is the reason we have not had any further report to make.

The CHAIR: We will now listen to the report of the Geologist, Col. H. C. Demming:

Col. Demming read his report as follows:

REPORT OF THE GEOLOGIST.

By Col. Henry C. Demming, *Geologist, Harrisburg, Pa.*

It is difficult to keep pace with the advances and the technicality of Geology. In our State a very careful topographical survey is being made, to be followed with a much more detailed geological survey than the first or second, and all with the co-operation and finan-

cial aid of the United States Geological Survey. While this work is going on, something is being done by the Geologists of this Board, one of whom has, during the past ten years, been serving as the Geologist and Mineralogist of the Commonwealth. The service has been principally what is known as economic—giving a practical or commercial turn to geological subjects.

BUILDING STONE.

Part of the time during the past year has been devoted to building stone, large deposits of best quality being found here and there in almost every county. Take, for instance, the first county, alphabetically, Adams.

In Butler township, within fourteen miles of Gettysburg, and less than two miles from a railroad, was found two of the most beautiful as well as durable granitic rocks that have been discovered in America. The deposits are massive, and can not be quarried out with a thousand men in a century. The lighter-colored, reddish rock, with greenish prisms scattered through it, is a hornblende granite. On analysis it was found to contain the following constituents:

Silica, (SiO_2,)	77.60	per cent.
Oxide of Alumina, (Al_2O_3,)	13.05	per cent.
Oxide of Iron, (Fe_2O_3,)	4.95	per cent.
Lime, (CaO,)	1.90	per cent.
Magnesia, (MgO,)	0.848	per cent.
Manganese, (Mn,)	0.506	per cent.
Sulphur, (S),	0.260	per cent.
Loss on ignition,	0.52	per cent.
	99.634	per cent.

Its specific gravity was ascertained to be 2.63.

Some of the iron particles were magnetic.

In the rock no pyrite, marcasite or pyrrhotite was found.

No mica was discovered.

The hardness of the rock was determined as 5½ to 6, or the usual hardness of first-grade granite.

The samples herewith submitted show that the stone can be very highly polished.

This granite has been named "Pennypackerite," in honor of the Chief Executive of our Commonwealth.

The constituents of the darker rock are nearly the same though in somewhat different proportions. It is technically an augite syenite, with a small amount of quartz. This stone will be known to science as "Critchfieldite," in honor of our Honorable Secretary of Agriculture.

As a building stone, for exterior or interior work, there is probably no superior anywhere; and there is a peculiar beauty and attractiveness about it that will lead to a great demand for it for many purposes. In the second Geological Survey report of the State, this rock was noted on the map as "trap." The samples exhibited herewith show the rock in all forms of dress by the granite cutter,

and one piece sets forth the stone as it was originally exposed—truly very unattractive.

DEEPEST WELL IN AMERICA.

Your attention is now called to the draft of the deepest hole drilled by man in America—and there is only one other deeper artifically-made hole in the world, that is Schladebach, Prussia. This deepest well in the United States is near West Elizabeth, Allegheny county, and was sunk by the Forest Oil Company, under the management of the Standard Oil Company, in 1898. The draft gives both geological and record sections. My object in producing it is to show the limestone beds at a depth of over a mile, and the temperature of water in the well at various depths. You will observe that at 5,180 feet they encountered a mass of limestone 50 feet thick; then alternate beds of slate and limestone, and then a bed of limestone five feet thick at a total depth of 5,445 feet, with slate and shells 30 feet below that; or at 5,475 feet below the surface of the earth, unmistakable evidences of former animal life.

The temperature taken at the various depths are intensely interesting: At 520 feet, 57 degrees Fahrenheit; at 2,250 feet, 64 degrees; at 2,340 feet, 78 degrees; at 5,000 feet, 120 degrees; at 5,385 feet, 127 degrees; and, at the bottom of the hole, 5,575 feet, a little over 130 degrees. At the rate of heat progression from 5,000 feet to 5,575 feet, 10 degrees, or one degree increase in every 57½ feet, boiling water or steam would be reached long before a depth of 10,000 feet. This notable increase of temperature with depth has been recorded in connection with a number of deep wells in Western Pennsylvania and West Virginia, and also in the Tamarach mining shaft in Northern Michigan, now down about 5,200 feet, with a probability of going to 6,000 feet, if the water and air do not become too hot to be borne by the miners, notwithstanding cold air being forced down, and ice-cold water poured over them every few minutes. In the great railroad tunnel now being built through the Alps, of a less vertical depth than 6,000 feet, water so hot has been struck that one end of the tunnel, sloping inward, had to be abandoned, and in the other end the men can now work only one hour a day on account of the intense heat.

Having called special attention to this feature of the proved interior heat of the earth, I wish to state that the heat is not invariably the same at given depths. The effect on the surface of the earth of these changes of temperature underneath should be most carefully studied, as it may have something to do with changes of temperature at the surface; and thus with the sudden meteorological changes that our National Weather Bureau so frequently fails to foretell. This world was made for man, not man for the world; and we are to solve the mysteries of its great depths as well as its surface and that which is above us.

ARTESIAN WELLS.

Last year there was some discussion on the purity of water in deep wells, and an allusion to artesian wells. Our school-books and most of our standard works tell us that water flows from the

mouths of artesian wells because the source of the water is at a higher altitude. This is not always so. Sometimes water has been stored in great reservoirs, somewhat similar to petroleum or natural gas. Where the water area is very large, and the overhead or ceiling rock is also of great length and breadth, and the enormous pressure from above has led the overhead rock to press down upon the water, as surely as that water is reached by a drill-hole, just as surely will there be a flow of water from its mouth until that pressure is relieved. Many of the flowing wells that we have, can have the continual flowing accounted for in no other way.

GLACIAL ACTION.

Perhaps no state has more evidence of a one-time glacial action than Pennsylvania, and this accounts for boulders in fields and other places made up of constituents found nowhere else in the vicinity. Some of these were carried to our State ages ago on floating ice, and deposited as the ice melted. I have noticed evidences of glacial action as far south as Albemarle county, Virginia, or near the centre of that state. To glacial action is due some of the marked changes in soil, sometimes in a single field, though, as a rule, the changes are due to the decomposed rock beneath, or it may be, of the hills nearby.

VOLCANIC ACTION.

During the past two years, much has been discovered in Mifflin and Bedford counties to lead to the belief that at one time there was volcanic action in that part of the State. About one mile north of Saxton, Bedford county, along the Raystown Branch, there are two small craters apparently of volcanic origin; while four miles west of McVeytown, Mifflin county, there are large deposits of rich brownish, breccia-like rock, seemingly also of volcanic genesis. The samples exhibited herewith are certainly interesting, mottled with such a contact of yellow, whitish and brownish angular pebbles as are seldom, if ever, found anywhere.

CONCLUSION.

While some of the geological features of this report may seem to bear somewhat remotely on the subject of agriculture, I think, upon close investigation, that they will be found to have more to do with the welfare of the farmer than might appear from only casual thought. The first paragraph on building stone may cause him to investigate to see if he has not something on his own farm quite as good, if not better; and the other subjects may lead to an investigation at home which may throw still more light on the complicated geological make-up of the rocks and soils of our State.

The CHAIR: You have heard this paper read. What action shall we take on it?

MR. BLYHOLDER: I move that the paper be received and filed.

The motion being seconded, it was agreed to.

On motion, the meeting adjourned to 1.30 P. M.

Wednesday Afternoon, January 25, 1905.

Meeting was called to order by Vice President Hutchison.

MR. RODGERS: Mr. Chairman, I have attended quite a number of meetings where the standing committees have not made written reports. They have made verbal reports. I therefore wish to offer the following resolution:

Resolved, That hereafter all annual reports of specialists of the Board and chairman of standing committees shall be in writing and shall not occupy more than 15 minutes in reading.

The resolution was adopted.

The CHAIR: I see present, Worthy Master Hill of the Pennsylvania State Grange, and if there isn't any business just now, I would call on him to say a word on some subject that may come to his mind.

MR. HILL: Mr. Chairman, Members of the State Board of Agriculture: I am very glad to meet at this time the members of the State Board, because we are working, in a great many respects, along lines that are parallel and are similar. At the present session of the Legislature, a number of bills will be presented of more or less interest to all of us, on which we ought to be united. It occurs to me that the sentiment in our State now affecting agricultural interests is certainly in good shape, and if we manifest to the members of the Legislature an earnest and united desire for the accomplishment of some specific legislation, it can probably be secured at this session of the Legislature.

As a representative of the Grange, I want to state to you that our organization is especially interested in legislation to give the trolley companies a right to carry freight in this State. There are only one or two states in the Union in which that right is denied, and it seems to me that there is no excuse for our not having it. There will be a bill introduced to give trolley companies the right of eminent domain. I am disposed to think that most of our farmers are disinclined to give trolley companies this right, which would permit them to take land for their tracks whenever they are disposed, and even to use the public highways for their particular benefit. I think the highways of our State should be reserved for the use of the traveling public generally, and not be monopolized by private corporations.

Then we are interested in enlarging our educational facilities in Pennsylvania. It is true that we have quite a liberal appropriation now, some eleven millions of dollars, although that has been diverted to some extent, as Normal schools and township high schools are being maintained from it. This is not anywhere nearly sufficient to meet the needs of these worthy institutions; I say institutions advisedly, because farmers ought to have the privilege and the right to have the higher educational advantages at their

own homes; therefore, I think we should have larger appropriations to meet the needs of our township schools.

Then there is another matter in which we are interested, and that is public road improvement in the State. The road law passed two years ago does not seem to be very beneficial; in some parts of the State not at all beneficial. The conditions are such that some counties are getting no benefit from it, and others are getting some benefit. This road-building proposition is a great big proposition, and it is a hard proposition to handle, but I think that we can get together and work out something that will be more satisfactory than our present condition under the provisions of the road law now existing. I am sure Commissioner Hunter will help us to that end. In conference with him we have found him to be very fair and anxious to support legislation that will secure the best results.

I want to congratulate our people and the members of the Board of Agriculture for the interest they have displayed in agricultural work.

The CHAIR: It should not be surprising that a good feeling exists between the agricultural organizations of Pennsylvania. It does us all good to hear the kind words of cheer that Brother Hill has given.

If we only had the means to maintain a Legislative Committee here at the capital during the session of the Legislature, it would be a great thing; then we could keep in touch with legislation all the while. We come here and pass our resolutions, and appoint a Legislative Committee, and then we disperse, and that is the last of our work until we meet again. Now, if we had some way to maintain this committee here and had the means to sustain them, and they could consult with their friends on these subjects, it would be a very great influence for good for the farmers of Pennsylvania; but we have no means to provide for this committee, and it is a great misfortune that we have not, because when the farmers come up to the Legislature, as other interests do, with their committees, and make their requests, they will be listened to. If we had a good appropriation to maintain such a committee—a good strong committee to look after these things that we talk on and decide on—it would be greatly to our benefit.

PROF. SURFACE: I should like to take the time to show the contents of that owl's stomach that I had here in the room last night. It is, as I predicted last night, a mouse. There may be persons who are interested in it, and I will pass it around.

The CHAIR: Next thing on the program is the report of the Committee on Floriculture, by Edwin Lonsdale.

The Secretary stated that Mr. Lonsdale was not present but that he had the report.

MR. BLYHOLDER: I move that the report be received and placed on file.

The motion being seconded, it was agreed to.

The Report of the Committee on Floriculture is as follows:

REPORT OF THE COMMITTEE ON FLORICULTURE.

By Edwin Lonsdale, *Chairman*.

Mr. Chairman and Members of the Pennsylvania Board of Agriculture—Gentlemen: It is my pleasant duty to report to you that floriculture in all its branches is in a very satisfactory condition. The demand for what are known as hardy herbaceous plants is still on the increase, so much so that, notwithstanding the fact that the area devoted to the propagation and growing of this interesting class of hardy plants has been largely increased, the supply has, in many instances, not been equal to the demand.

Among hardy roses, the climbing Crimson Rambler is still in the lead. Its crimson blossoms in the latter part of May and in early June brighten many a home from one end of this country to the other. It is perhaps the most universally popular rose in the whole list. In addition to its being quite hardy in all parts of America, it also lends itself to forcing purposes, so that it may be had in bloom for Easter, as it is one of the most popular flowering plants for that floral festival. And now we have a very welcome addition to this class of hardy rose, namely, what is designated the dwarf or baby ever-blooming Crimson Rambler, a French rose, known as Madame Norbert Levavasseur. Plants of this new variety that I have had under my care have given most satisfactory results. Small plants were received in August last, which soon commenced to grow with vigor and flower in profusion. On October 23d, every bloom and bud was removed, and the first week in December it was again in full bloom, and it has been in bloom ever since (this treatment was under glass, of course), showing that it may be had in full bloom for Christmas—something unusual to have flowering plants of roses in bloom at that season of the year. It is also quite hardy, living out doors all winter with little or no protection.

Another rose of a different type to the last named is Killarney, an Irish-raised rose. This was sent out some years ago as a forcing rose for cut flowers in winter, but was discarded by some florists, myself among the number, because it lacked what is technically known as substance, that is to say, the petals seemed flimsy. It is ideal in the shape of the bud, being long and pointed, and it is a pleasing shade of pink in color. While, as stated above, it was discarded by some florists, it was held on to by others, and is now quite popular in some cities for winter, showing that we must not be too hasty in discarding novelties. But it is as a hardy outdoor rose that it is making its mark, as it is pronounced by some leading amateur rose growers in Eastern Pennsylvania to be the best outdoor rose extant, at least for the vicinity of Philadelphia. It sometimes happens that a new plant that is disappointing when first tried turns out to be of exceptional merit later on.

It is reported there were more flowering bulbs, as tulips and hya-

cinths, planted last autumn for flowering next spring than ever before.

A new red rose is creating favorable comment among growers of roses for cut flowers in winter. It is named Richmond. It is an American seedling and is named for the city of Indiana where it was raised. Already orders for it have been booked numbering fifty thousand; the prices for which will average possibly $250 per thousand.

The improvements among carnations for winter-blooming are still going on. A pink variety, known as Financee, is a production of Indiana but has been purchased by a firm of Illinois specialists, and is to be disemminated the coming spring. A scarlet variety from New York state is named after a Philadelphia florist—Robert Craig—and another in the same line of color, but distinct from it, also from the same state (New York), is called Victory.

The scarlet color is very popular at Christmas time, either as cut flowers or plants in bloom at that season. Also plants with red berries, as Ardesia Crenulata. The English holly bushes in berry are imported in limited quantity. Plants that have been trained and grown especially for said purpose only are sent over. Sometimes the bushes arrive in excellent condition, but at other times they do not. The trouble seems to be that they do not like the close confinement in the hold of the ship, and frequently lose their leaves as a consequence. This species of holly has a deeper, richer green than does the native American variety, and is to be preferred on that account. It is sometimes found flourishing in this country, but generally speaking, it does not do well. The north side of a hill in states south of us where the winters are not quite so rigid as we are liable to have them is where I firmly believe it would prove to be a very profitable investment. It is possible there are some north hillsides in Pennsylvania that would do for the purpose. Experiments in a small way could be made without much expense, and in view of the possible profits, it is worth while making an effort to acclimate this very valuable evergreen. It is used in England quite largely as a hedge-plant and is kept closely clipped as are some evergreens in America. An English writer thus describes it: "First and foremost is our English Holly (Ilex Auguifolium) always beautiful from the little seedling to the tall pyramidal tree, and beautiful from the little seedling to the tall pyramidal tree, and what a possession is a long holly screen! impervious to the eyes of the envious, the entrance of the schoolboy or the tramp, everywhere presenting among its scarlet berries the sharp points of its prickly leaves, like the bayonets of a regiment glistening in the sun." This may not appear to belong to floriculture, but it does, as there are hundreds of thousands of dollars' worth of the native holly (Ilex Opaco) handled by florists in all the cities of America. The holly now under consideration is found growing wild in many states in the Union. The Philadelphia market is, speaking generally, supplied from Southern New Jersey, Delaware and Maryland.

In conclusion, let me say that the standard among flowers and plants and everything embraced under the head of floriculture is becoming higher each year, and the buyers more critical, and it behooves all those belonging to the craft to fully realize the same as soon as possible.

The CHAIR: The next thing in order is the report of the Committee on Forestry, by Dr. J. T. Rothrock, Chairman.

The SECRETARY: That report is in my hands also. Dr. Rothrock will not be here.

On motion, the report was received and placed on file.

The report is as follows:

REPORT OF THE COMMITTEE ON FORESTRY.

BY DR. J. T. ROTHROCK, *Chairman*.

In the first week of the new year 1905, there was convened in Washington one of the most notable gatherings ever held in that city. It comprised, on the one hand, the practical business men of the entire United States, representing railroads, lumbering and the pulp wood industries, to say nothing of live stock interests, including horses, cattle and sheep. There were present also on the other hand those who, ten years ago, would have been recognized as mere forestry agitators; who were regarded then as men without definite ideas as to what was desired or how to attain it even if they had known. In all there were about 1,000 delegates. The President himself endorsed the call for the meeting and also made the leading address before the Forestry Congress in the National theatre at Washington. This Forestry Congress was notable, not only because of the number of representatives, but because the foresters on the one hand and the leading business interests on the other had come to recognize that neither alone was equal to the great task before it, of restoring the waste places of the country and maintaining a perpetual supply of timber for our national industries.

This meeting is alluded to merely to show that forestry has passed beyond the domain of theory or doubt and reached a recognized place as one of the most important movements of this period. It is particularly gratifying to note that, after the years of tribulation and labor which the advocates of forestry in this State have had, Pennsylvania was, in that distinguished meeting in Washington, accorded the leading place in the roll of states for the work already accomplished.

This seems to be a proper place to state, that after twenty years of agitation, the State of Pennsylvania has now attained every purpose that it had in view when the agitation commenced. It is rarely indeed that anything which amounts to a revolution in our thought upon a particular branch attains the object for which the movement was started within the life-time of the generation which began the

agitation. It certainly was not so with the anti-slavery movement nor the temperance crusades, nor with other crusades to which we might well allude in this connection. The forestry movement, therefore, in the rapidity of the strides which it has made, stands alone in this State.

With the lands already acquired and those whose acquisition is practically assured, the Commonwealth may be said to be in possession of 700,000 acres of land upon which to develop its forestry system. From this on, the efforts of the Forestry Department will be directed to actual work in the care of the land already obtained and that which may in future be obtained.

The Forestry School started two years ago has been quite as successful as any new institution, working upon new methods, could be expected to be; that it was needed, there can be no doubt. It is equally certain that it will accomplish the object for which it was started. There are now twenty pupils in attendance and many applicants were rejected. The distinguishing feature of this institution from all of the forestry institutions, except Biltmore and Berea, is that our pupils here conjoin actual labor with their studies, and we might just as well say, parenthetically, that it is actual labor.

The State Sanatorium, for the cure of indigent consumptives, has earned for itself a recognized place, not only in this State but in almost every state of the Union. It would have been a narrow policy indeed which would have prevented the use of the reservation for this purpose. Every acre of this ground belongs to the people of the Commonwealth, purchased with their money and held in trust for their uses and benefits. We would have no right to allow the plea, which has already been made, that the work of a sanatorium is foreign to the work of forestry, and we tender our respectful sympathy to those advocates of forestry who see no other use for a forest reservation than a mere growth or restoration of timber. In all, about eighty patients have been treated, and out of this number over 60 per cent. may be considered as actually restored to health, or so far on the road that ultimate recovery seems assured.

It has been the policy of the Forestry Department to proceed no more rapidly in forest restoration, or care, than public sentiment demanded. We wish to avoid all appearance of an unwarranted expenditure of public funds. The time seems, however, to have arrived in which the land acquired must be cared for; that is to say, protected against trespass in the way of removal of timber and destruction by forest fires. This can only be accomplished by having a larger number of wardens than are at present employed. I believe it would be perfectly safe to say that there should be one warden for every 5,000 acres of forest land. This forestry movement in Pennsylvania is a business proposition. The State has come into the care of its timber from motives of economy and it should be managed as any other business proposition is, that is, with a view to the largest returns of the best timber in the shortest possible time. If the land is not worth protecting, it was not worth purchasing, and no pennywise parsimony of the present can be justified in the light of future wants. There should be hundreds of thousands of young trees, not to say millions, placed in the ground every

year, and they should be cared for. The State forest nurseries should furnish gratuitously to the agricultural community a limited number of forest trees whenever proper guarantee is given that they will be cared for, as no nursery could be expected to expend its labor, send out its trees, and have them neglected. The agricultural interests of the community, which have so often demanded that the State furnish them forest trees gratuitously, should bear in lively remembrance that they would have a duty to perform after receiving those trees.

Forest fires which have hitherto proved so destructive, have never been under so good control in this State as during the past season. We, no doubt, shall have in this Commonwealth, our patience still severely tried by their annual occurrence, but after all the fault lies mostly with the citizens themselves. No law can be made self-operative; the best that any law can do is to give protection when it is applied by those interested. The Legislature has placed at the command of the citizens of every county in this Commonwealth, abundant means to protect their forest holdings, if they will enforce them. The law which makes it the duty of constables to summon a *posse* and fight forest fires has been pronounced constitutional by careful and judicious judges in this Commonwealth, and it is the duty of the county commissioners to pay those who give their labor to protect our lands. The statement that the price paid for fighting forest fires is an inducement to create them is too puerile to merit attention. There is no harder way that I know of for a man to attempt to earn 12 cents an hour than by fighting a forest fire, and it is noteworthy that those who have made the statement, that this law was an inducement for the creation of forest fires, have never been able to furnish a single instance to justify their assertion. In my judgment, what is needed more than anything else is simply a rigid application of the remedy which is in the hands of every citizen. It is encouraging to note, however, that public sentiment never was so crystallized in this State against those who start forest fires as at present, and this may be regarded as a reasonable guarantee that fires in the future, probably, will be fewer in number and less severe than those of the past have been under other conditions.

It is worthy to note here, that forestry does not necessarily preclude the use of growing timber, in fact, it is for the growth of timber that forestry exists and for the legitimate use of it, when mature, or when it can be marketed to best advantage without injury to the remainder of the crop. It should also be stated that in almost every young forest having a stand of average thickness, there are many trees which have been properly designated as "suppressed trees." That is, owing to a disadvantage of position, or to inherent weakness or to lack of adaptation to the situation, others of different kinds, or even of the same kind may have towered above them. In general, it may be said that these trees are the least promising of the forest, at least, when the forest is mainly of one kind of tree. Under such conditions, it is usually of advantage to the remaining growth to remove those suppressed trees when they stand in the way of the growth of the other trees. Hence then, at every stage in the growth of a forest there are certain trees which can be removed, as a rule, with advantage to the remaining trees.

This you might speak of under the name of improvement cutting. A certain amount of work of this kind has already been done in the forestry reservation of the State and more probably will be done. Considerable quantities of pulp wood and fuel have already been sold from the reservation, not only without detriment to the reservation, but as an improvement to it. There are thousands of acres in this State now owned by the Commonwealth which should be judiciously thinned out, and by this I do not mean that the ordinary lumberman or wood-chopper should be allowed to go in and swing his axe with the freedom that he has hitherto exercised in other cuttings. No State reservation should at any time be thinned out except under the care of a trained forester. Upon this point I cannot be too emphatic. It were better far that every tree should be allowed to stand than that an untrained man should go in under the plea of an improvement cutting to mar or ruin the entire crop of trees.

For several years you have honored me by making me the chairman of your Committee on Forestry. For the past year I have endeavored to avoid all public appointments of any kind whatsoever. Increasing age and pressure of my own personal business demands now that I ask you to accept my resignation as chairman of your committee of forestry and to appoint some one in my place. I beg, however, to thank the State Board of Agriculture for the numberless acts of kindness and appreciation which I have received at their hands.

With every wish for your personal and official prosperity, I am, gentlemen, with great respect, your most obedient servant.

The SECRETARY: I want to call your attention to one item in the report of Dr. Rothrock. He closes his report with the request that he shall not be continued in that position as the Chairman of the Committee on Forestry. This perhaps had better be attended to by the Executive Committee.

The CHAIR: The next thing on the program is the report of the Committee on Cereals and Cereal Crops, A. T. Holman, Chairman.

Mr. Holman read his report as follows:

REPORT OF THE COMMITTEE ON CEREALS AND CEREAL CROPS.

BY A. T. HOLMAN, *Chairman.*

Before commencing the report of our cereal crops of this State, I think it would be appropriate to give a short sketch of what has been done in agriculture in a general way.

When the record of the year just closing is made up and account is taken of all that 1904 has given to the world in the way of in-

vention and discovery, it is doubtful, if in any other branch of industry, greater advance will be found to have been made than in agriculture. True, what has been done does not wear that aspect of the sensational, as for instance attaches to Marconi's brilliant achievement in wireless telegraphy, yet even of larger moment of the world have been some of the advance steps taken in agriculture.

We are told, "still waters run deep." Agriculture lies deep at the foundation of things that relate to the material life of the world and its vast processes go forward like the movements of the heavenly constellations in silence. But when the account is taken, when we reckon up what all we have witnessed means, it is found difficult to express in words or figures what the changes brought about actually represents in the life and welfare of the world.

Consider how short a time it has been since the thought of the scientific world was turned to agriculture at all. Count your fingers and you will have fingers enough to express the number of years since sufficient numbers of trained instructors could be had to man the agricultural colleges of the country.

We have not yet attained to perfection; but what has been done in that short time is a promise of a future roseate and full of cheer to the men and women who love the soil and find their greatest pleasure in remaining close to it.

The possibilities of an acre are as yet unknown. Allow me to quote a few of Secretary Wilson's figures for the year of 1904. Abundant prosperity has been enjoyed by the American agriculturist during the year of 1904. It is true a few exceptions may be noted to this general condition, but these exceptions are few in number and trifling in importance.

The corn growers have had good crops and fair to large prices. The cotton growers who sold early realized handsomely. The cattle growers have not had their full share of prosperity. They are not getting fair prices when we compare what they obtain for the cattle with the cost of meats to the consumer. There is something radically wrong somewhere and a readjustment is due.

Nineteen hundred and four has been a greater financial success to the farmers than 1903. One conspicuous item that has contributed to this abundant prosperity is the corn crop. Nearly reaching the high-water mark of 1902, the corn crop closely approached two and one half billion bushels, and with the high prices of this year this crop alone has a value to the farmers far exceeding $1,000,000,000.

The cotton crop ranks second in point of value to the farmer realizing $750,000,000. Wheat and hay fought for third place; the two crops reached nearly as much as the corn crop. Potatoes and barley reached their highest production in 1904.

The oat crop was never so large by 60,000,000 bushels except in 1902. More rice was produced than in any previous year, by approximating 300,000,000 pounds. This list could be continued *s ia t* to emphasize the prosperity of 1904, but will now confine myself to the report of this State as I understand them from points gathered from observation, correspondence, paper reports, etc.

The season has been rather a varied one for the cereal crops of Pennsylvania. The weather at the time of seeding wheat in the fall of 1903 was very unfavorable in many sections. It being excessively wet and much of the seeding was retarded until October,

wheat did not make as rank a growth as is required for the severe winter we had. Much of the ground not being covered and fields exposed to the north suffered severely; but about the middle of April the season of fine growing weather opened and in fact continued so until almost harvest, which gave the plants that remained a good start and it was surprising how the wheat fields recuperated, but, as a rule, was too thin on the ground to make a large yield; but we in our vicinity have had a fair crop of the best developed berry we have had for some years. Our highest yield was 30 bushels per acre, and the best average yield was 24.

Some counties of the State, were less fortunate than we, Chester county being reported to have a light crop of inferior quality. The average crop report of the State is a fraction less than 13 bushels per acre. The ten-year average brings it a fraction over 13 bushels per acre. If reports be true the farmers of the State do not have much to complain of. Considering that we do not have a great wheat growing state on the average and the price advancing about 30 cents per bushel, we should not complain.

Rye is a much neglected crop in this State; in fact more so than it should be, from the fact that it can be grown successful on soil where wheat is doubtful and is usually a good yielder when not sown early. Threshers report late sown rye well-filled. I think the growing of rye should be encouraged by the farmers of Pennsylvania from the fact that the grain is such a valuable feed and it grows more straw to convert into manure; or if you can afford to sell it, you can realize $20.00 per ton in the cities when properly delivered.

The oat crop has been a large one in Pennsylvania. We appear to have had an ideal season, it being cool and moist with cool weather at the ripening period. Threshers report very good average. The highest average I have any knowledge of is 82 bushels per acre, with 60 bushels reported on rather poor soil. Oats appears to be very much of a weather crop. If weather conditions favor them they are usually a good yielder and when weather conditions are unfavorable, it does not appear that condition or preparation of soil will be of much benefit. Our crops for the last few years has been from 16 to 30 bushels per acre, which is very discouraging. But it suits many of us so well in our rotation from corn to wheat that we take our chances on a crop.

Corn. The season for corn has been a very favorable one as far as moisture was concerned, the planting season being favorable, but the seed was the most treacherous for many years, due to the very early freeze in the fall of 1903, before the corn was dry enough in the cob, the germ being injured by excessive moisture in the cob at the time of the early freeze about November 5. Seed that had not been cured by means of artificial heat, was treacherous, some having vitality sufficient to start the roots but not sufficient to start the plant. Others failed to start either. In fact all seed was so treacherous that anything like a fair stand was the exception and not the rule.

The frost of September 22 and 23, injured the corn to a certain extent especially the late or replanted corn, which was frozen before maturity. The corn fields after frosts presented a pitiful sight and caused quite an amount of chaffy corn. Farmers should always

take good care of seed. While it is quite a task to do so, there was more money lost in the past year by not giving the best care to it than for many years.

Buckwheat is not grown very extensive in this State, though it is a very profitable crop on poor, light gravel soil, and some report more than 50 bushels per acre this season and of good quality, having had very favorable weather to harvest the crop. This is also a crop that could be grown profitable on many farms, on poor bluffs and out-of-way places, it being a great crop to exterminate noxious weeds, etc., and leaves the soil in a nice mellow condition to be sown in small grain and return to grass.

The outlook of the growing wheat crop in our section is only fair. The quite early seeding made good growth, but the medium and late sowing made but small top growth due to the weather being too dry. But the roots may have been benefited at the expense of the top and it having had slight covering of snow it may do better than we think at this time.

The average crops of the past season have been fair and prices above normal. The farmers have but little to complain of.

I might add that we had a good crop of clover seed in our section and which brought a fair price.

The CHAIR: You have heard the report. What disposition will you make of it?

MR. McCLELLAN: I move you that it be received and filed.

The motion being seconded, it was agreed to.

The SECRETARY: I have just noticed that our Ex-Secretary Hamilton is present. I know that all present would be glad to hear from him.

The CHAIR: We will be glad to give Prof. Hamilton a short time.

ADDRESS.

BY PROF. JOHN HAMILTON, *Farmers' Institute Specialist. Washington, D. C.*

Gentlemen of the State Board of Agriculture: I was on my way from the Northwest down to Washington, and knowing that the State Board of Agriculture was holding its session at this time, I could not resist the temptation to stop off only for a day to see and greet the old friends who gather here in this annual meeting. I have just come from a meeting in Fargo, North Dakota. The agricultural people of that section are interested in their business; indeed, I think there has never been a time in the history of this country when so many people are interested in agriculture, not agricultural people, but people in the cities, professional men, bankers, lawyers, physicians, business men, as well. There has come within

the last ten years, all over the United States, a revival of agricultural interest, and whether you go to Texas or to North Dakota, go to the east or to the far west, you find the same feeling of interest everywhere. People, the best people, in all of the States, without respect to their profession, are beginning to seriously consider what can be done to advance the interests of agriculture.

The meeting that I attended at Fargo, had, one evening by actual count, nine hundred people in the room, and perhaps seven hundred of these were farmers who had come down from the Red River Valley, up from South Dakota, and over the river from Minnesota. They stayed for several days, paying their hotel bills, attending the meetings, beginning in the morning at nine o'clock, running up until twelve, beginning at half-past one and continuing until half-past four, and then again at seven o'clock and going on as late as ten. So that even in the far north, you find agricultural people and others awake to this great interest.

I believe, Mr. Chairman, that the farmers' institutes have had as much to do with awakening this interest as any other influence that we have. Until recently the farmers were not reached by any agency except the agricultural papers, and many of them did not even take an agricultural paper, but within twenty years the institutes have come in and have taken out into the country districts information—scientific information—of a very efficient kind. The result has been that the farmers have come now to realize that there is a vast amount of valuable scientific information in existence which they need. There is also a knowledge of the fact that it is possible to take this scientific information and impart it to practical farmers who have very little if any scientific training, in a way that they can use it. These two facts have now come to be understood by the great body of agricultural people. The effect has been to make people feel that, instead of farming being a mere manual occupation, it is highly scientific, and everywhere among the more intelligent agricultural people, you find that they have settled down to this idea, that the whole of agriculture lies in education; in the kind of education that enables men to understand their business; the kind that we call agricultural education. Men are coming now to feel that if they are to be saved from the ills that beset agriculture, their hope lies in education, in their own better knowledge of their calling. In other words, it is just coming to be realized by agricultural people that the man who is to succeed in this business, must do precisely as men do who succeed in other business, they must acquaint themselves with the business; they must know their business. Fortunately a great deal has been discovered, and a great deal of material is at hand, which has been prepared by men who are thoroughly conversant with the agricultural conditions of the country, and who are at the same time scientific, who are adapting scientific truths to the needs of the everyday farmer.

Pennsylvania is not behind in this work, although she is not at the front, I am sorry to say. I think she is going to be at the front very soon. We have just waked up in our State to this fact, that if we are to be classed with people in the front rank of the states of the Union in agriculture, we must do the same things that these other states are doing. We must foster agricultural education, and by that

I mean, we must encourage everything that tends to distribute information among the farmers that will be of value to them in their calling.

I understand, Mr. Chairman, that some of our friends here are talking up a State Fair. That is one form and an important form of agricultural education. Some of our states are making a great deal out of their State Fair. Pennsylvania should do as much in this direction as the best. There is our State College that needs help to make it most serviceable to the State, our State Department of Agriculture needs the support, sympathy and help of all of our agricultural people, needs a lot of money to do its work, and needs additional force of men properly equipped for work. So also the State Board, to which agriculture is perhaps indebted as much as to any other influence in our State, the old State Board is beginning to feel that they are still of use in the State of Pennsylvania, and are taking a hand in this great uplifting that is going on. It must be a gratification to the older men who are here, to see the fruitage that is coming from the efforts that they have been making for the last twenty-five years.

To show how leading business men regard this revival of agriculture, in talking with a gentleman in this city who is a banker, said: "Up until a short time ago, electricity was the great thing in this country; the leading interest, and along those lines there was believed to be the greatest development," but he says now "agriculture is the greatest thing in this country, and agricultural education is the greatest thing in agriculture." So that you can see how business men, bankers and professional men everywhere are coming to realize that the calling that we have adopted is the leading profession, and the country is needing more than all else competent agricultural teachers, and skilled agriculturists.

I am very much pleased to meet with the old State Board and to renew this acquaintenance that has been so delightful through all these years. I hope that the near future will show to you the realization of the things that you have been working for during the years in which the Board has been organized, and that it will be a justification for the existence of the Board and a full reward for all the labor, money and effort which you have expended during the time you have existed as a Board in Pennsylvania.

MR. BLYHOLDER (in the Chair): We certainly feel very thankful for the words of good cheer and encouragement from our ex-Secretary.

We shall now proceed according to our program and take up the next subject, "The Breeding of Cereals," by Prof. Thomas F. Hunt, of Ithaca, N. Y. I have the pleasure, gentlemen, of introducing Prof. Hunt.

While Prof. Hunt was arranging some charts to be used in his address, the Executive Committee reported as follows:

REPORT OF THE EXECUTIVE COMMITTEE.

ADVISORY COMMITTEE.

N. B. Critchfield, Secretary, ... Harrisburg.
S. X. McClellan, ... Knox.
D. A. Knuppenburg, ... Lake Carey.
J. A. Herr, ... Mill Hall.

CONSULTING SPECIALISTS.

Botanist,	Prof. W. A. Buckhout,	State College.
Pomologist,	Dr. J. H. Funk,	Boyertown.
Chemist,	Dr. William Frear,	State College.
Vet. Surgeon.	Dr. Leonard Pearson,	Philadelphia.
Sanitarian,	Dr. Edward Patrick,	West Chester.
Microscopists and Hygienists,	Prof. C. B. Cochran,	West Chester.
	Dr. Geo. G. Groff,	Lewisburg.
Entomologists,	Prof. D. J. Waller,	Indiana.
	Prof. Franklin Menges,	York.
Ornithologist,	Prof. H. A. Surface,	Harrisburg.
Meteorologists,	E. R. Demain,	Harrisburg.
	J. L. Heacock,	Quakertown.
Mineralogist,	Col. Henry C. Demming,	Harrisburg.
Apiarist,	Prof. Geo. C. Butz.	State College.
Geologists,	Col. H. C. Demming,	Harrisburg.
	W. H. Stout,	Pinegrove.

STANDING COMMITTEES.

LEGISLATION.

Hon. A. J. Kahler, Chairman, ... Hughesville.
Hon. Jason Sexton, ... North Wales.
N. G. Temple, ... Pocopson.
H. G McGowan, ... Geiger's Mills.
M. N. Clark, ... Claridge.

CEREALS AND CEREAL CROPS.

J. A. Eschbach, Chairman, ... Milton.

ROADS AND ROAD LAWS.

P. S. Fenstemaker, Chairman, ...Allentown.

FRUIT AND FRUIT CULTURE.

John F. Boyer, Chairman, ...Freeburg.

DAIRY AND DAIRY PRODUCTS.

R. J. Weld, Chairman, ...Sugargrove.

FERTILIZERS.

Howard G. McGowan, Chairman, ...Geiger's Mills.

WOOL AND TEXTILE FIBRES.

D. S. Taylor, Chairman, ...Raccoon.

LIVE STOCK.

D. A. Knuppenburg, Chairman, ...Lake Carey.

POULTRY.

Norris G. Temple, Chairman, ...Pocopson.

FORESTS AND FORESTRY.

Irvin C. Williams, Chairman, ...Harrisburg.

APIARY.

J. W. Nelson, Chairman, ...Shawville.

FLORICULTURE.

Edwin Lonsdale, Chairman, ...Girard College, Phil'a.

A. I. WEIDNER,
D. A. KNUPPENBURG,
S. X. McCLELLAN,
E. E. TOWER,
HOWARD G. McGOWAN,
A. J. KAHLER,
J. NEWTON GLOVER,
NORRIS G. TEMPLE,
Executive Committee.

The CHAIR: You have heard the report. Will you receive and adopt it?

It was moved and seconded, that the report be adopted as read, which was agreed to.

The CHAIR: We will now hear from Prof. Hunt.

PROF. HUNT: Mr. Chairman and Members of the Board of Agriculture: It was my privilege and pleasure to be a resident of your State for one year, and I am pleased to be back here again.

Prof. Hunt then read his paper as follows:

BREEDING CEREALS.

By Thomas F. Hunt. *Professor of Agronomy. Cornell University. Ithaca, N. Y.*

The Improvement of Seed: A recent book opens with this phrase: "The whole business of agriculture is founded upon the soil." The sentence is completed with the statement: "For the soil the farmer pays rent, and upon his skill in making use of its inherent qualities depends the return he gets for his crop." Suppose the author of the book should plant wild crab apple trees upon the best land for the purpose in the world, would he market Baldwin apples? Would it not make a great difference in the return he would get from his land whether he offered the New York or London markets, crab apples. Northern Spy, King, or even Ben Davis? Would the difference inhere in the soil? At the Cornell Experiment Station last season, on similar soil we raised sugar beets containing 27.1 per cent. of dry matter, and yielding 12.75 tons per acre; mangels containing 10.4 per cent. of dry matter and yielding as high as 43.75 tons per acre. The sugar beet grows almost entirely under ground, the long-shaped mangel wurzels are from one-half to one-third above ground, while in the globe mangel, from two-thirds to three-fifths of the root is above the ground. The long-shaped varieties of mangels are from three to four times as long as broad, and there are all sorts of graduations until we come to the globe mangel, which is spherical or nearly so. The color of the skin of these different forms of beets were white, pink, red, orange and purple. There was almost as much variation in the color of the flesh. These are but a few of the most striking variations to be found in different varieties of mangel wurzels, and sugar beets, all of which have descended from the common red garden beet. Similar illustrations are to be found on every hand. The florist mixes one part of sand, one part of rotted manure, and three parts of rotted sod together, and in this mixture raises chrysanthemums of bewildering forms and colors. Why these differences? None of the differences herein noted were inherent in the soil. They inhered in the seed. Packed away in cells requiring a microscope to distinguish is the spark which causes a man to be black or white, Indian corn, yellow or white, the apple, sweet or sour.

The Forces of Heredity: It is a well-known fact that the handwriting of a son at thirty-five may be in some cases almost identical with that of his father when he was thirty-five, notwithstanding the fact that when the child was in school the teacher labored, and may have succeeded, in teaching him the Spencerian hand. Did

you ever think what a combination of mental and physical qualities are concerned in writing? Reflect that these qualities were transmitted to the son all wrapped up in a cell so small as to require a microscope to see the cell. It may be doubted whether any one with the highest power of the microscope can be said to have seen the vital principle which is responsible for these manifestations. Since in plants, pedigrees and performance-records of ancestors—a thing much to be desired—have not been kept, special examples of the tremendous force of heredity is best found in the breeding of domestic animals. There is not, and there probably never has been, a running horse of consequence that does not trace back to Herod, Eclipse, and Matchem, which in turn trace back to Byerly Turk, Darley Arabian, and Godolphin Barb. Almost without exception, at the present day, standard-bred trotters with any speed trace either to Hamiltonian Ten or Membrino Chief, and a large proportion of the best trace to one son of Hamiltonian Ten. The best Percheron horses trace to Jean le Blanc, lineal descendant of Arabian Gallipolis; the French Coach to Young Rattler, descendant of the thoroughbred Matchem; the hackneys to Scott Shales (692); the Cleveland Bays to either Dart. (83), Barley Harvest (447), or the Hob Horse (316); Gaited Saddle Horses to Denmark; Clydesdales to Prince of Wales (673) and Darnley, both related. Says Wallace, a well known English writer: "It may be safely asserted that nearly all the celebrated Shorthorns which have become famous within the period of which there is any written history of the breed have been descended more or less directly from a few famous bulls, notably Hubbock (calved about 1775) the Father of Shorthorns, and his much inbred descendants, Favourite (252) and Comet (155)." If this is true, the breeding of animals and of plants is not a lottery. Men reap what they sow, be it horses, cattle, corn, wheat, cheat or wild oats.

The Character of Heredity : This seems almost magical; but is it? Or is the hereditary transmission of characters a simple life phenomenon? Heredity has been defined as the overgrowth of the individual. Take a one-celled plant, a bacterium. Its mode of reproduction is to divide in the middle. Then there are two. Which father? Which son? Which mother? Which daughter? Which is to exercise parental control? Are you surprised that these twins were like the parent? What else could they be like? Why did this parent divide and become twins? Why not grow to the size of a football or even the earth? Because, as it grew its surface increased as the square of its dimensions, and its volume increased as the cube of its dimensions. Since it grew in volume faster than its feeding surface the time came when it could no longer support itself. This is remedied by becoming smaller. What difference between a one-celled plant and a corn plant, a horse or man. Simply that in these higher organisms there is a division of labor similar to that in the industrial world. Certain cells only are concerned in the reproductive processes while the majority of cells serve to protect them. These protecting cells grow old and die, but the reproductive cells of the higher organisms, like the one-celled organism, rejuvenate or make young the individual, while the body returns to the earth from whence it came. "Dust thou art, and unto dust

shalt thou return." There is nothing surprising, that the child should resemble its ancestors, that fast horses should product fast horses, or good wheat should produce good wheat. The surprise is, not that organisms reproduce themselves, but rather that they should ever vary as they so frequently do.

Forces Affecting Crop Production: The individual plant or a particular crop is the result of two forces: First, heredity, and second, environment, by which is meant climate, soil, fertilizers, cultivation, and whatsoever tends to promote or prevent the plant or crop reaching the highest development of which its hereditary power is capable. Where there are several factors bringing about a given result, all of which are necessary, it is impossible to say which is the most important. For example, it takes at least ten chemical elements to grow plants, any one being absent the plant will not grow. To raise a ton of hay requires about 1,000 pounds of carbon obtained from the atmosphere, probably less than 20 pounds of iron obtained from the soil. Can we say that carbon is more important than iron, when without the iron there can be no green plant? Since both seed and soil are necessary for ordinary crops, who shall say that one is more important than the other. Certainly both should be the best possible obtainable. There is this distinction, however. The increased yield of the crop by modification of environment, although a necessary process to agriculture, can only be accomplished by an expense more or less considerable. Heredity, on the other hand, is a silent force which acts without expense. If a plant be discovered that would produce, because of the force of inheritance, one grain of maize more on each ear than at the present, it would be capable of increasing the maize crop of the United States 5,000,000 bushels, not next year alone, but for years to come. This is the significance of improved seed. I quote from that wizard of the Santa Clara Valley, Cal., who has perhaps, produced more striking plant forms than any other man living or dead. Many of these forms have been of considerable economic importance. One of his latest, the spineless cactus, has untold possibilities for the arid half of the United States.

Says Luther Burbank, "The vast possibilities of plant breeding can hardly be estimated. It would not be difficult for one man to breed a new rye, wheat, barley, oats or rice which would produce one grain more to each head, or a corn which would produce an extra kernel to each ear, another potato in each plant, or an apple, plum, orange, or nut to each tree. What would be the result? In five staples only in the United States alone the inexhaustible forces of nature would produce annually without effort and without cost:

5,200,000 extra bushels of corn.
15,000,000 extra bushels of wheat.
20,000,000 extra bushels of oats.
1,500,000 extra bushels of barley.
21,000,000 extra bushels of potatoes.

"But these vast possibilities are not alone for one year, or for our own time or race, but are beneficient legacies for every man, woman or child who shall ever inhabit the earth. And who can estimate the elevating and refining influences and moral value of flowers with all their graceful forms and bewitching shades and

combinations for color and exquisitely varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously, and thus with better and still better fruits, nuts, grains and flowers will the earth be transformed and man's thoughts turned from the base, destructive forces into the nobler productive ones, which will lift him to higher planes of action towards that happy day when man shall offer his brother, not bullets and bayonets, but richer grains, better fruits and fairer flowers.

"Cultivation and care may help plants to do better work temporarily, but by breeding plants may be brought into existence which will do better work always, in all places and for all time. Plants are to be produced which will perform their appointed work better, quicker, and with the utmost precision."

A company in Illinois has a tract of 27,000 acres upon which they propose, if possible, to so breed the standard varieties of corn as to give the greatest feeding value per acre. They propose to breed corn with varying per cents. of fat or protein as seems possible by the experiments of the Illinois Station. If a company had proposed to breed Holstein-Friesians whose milk would contain a higher per cent. of butter-fat it would not be considered remarkable, yet the definite breeding of farm crops is so unusual as to create great interest in this new enterprise. The fundamental principles in breeding are the same whether applied to plants or animals.

Causes for Delay in Improvement of Field Crops: A number of circumstances have prevented the application of the principles of breeding to plants, although they have been applied to the breeding of animals for many years. Among the circumstances are the following:

(1) Lack of knowledge of sex in plants. The sexes in animals must have been known from the earliest times. The function of pollen and its necessity for seed formation has been known less than 400 years.

(2) The difficulty of control in plant breeding. The pollen of plants cannot ordinarily be confined, while the male domestic animal can be tied up by a halter or confined in a yard. In some plants, like corn, which is wind-fertilized, we have no knowledge of the plant from which the pollen came and consequently no knowledge of the characteristics of the sire. In other plants, like wheat, that are self-fertilized, two individuals cannot be mated without resorting to artificial means.

(3) The selection is usually made from the seeds. The seed is an embryo, not a mature individual. The characteristics of the mature chicken cannot be fully foretold by looking at the egg. The seed must be grown and the plant observed through youth, maturity and old age, before the characteristics of the individual plant are fully known. The individual animals are constantly under the eye of the successful breeder. The poorer animals are rejected and only the better animals mated. In the case of plants there is not only usually no mating but the mature individual from which the embryo is obtained for the subsequent progeny is unknown. This is not quite so true of maize as of the other cereals, because of the method of harvesting the crop. Even if the large ear of maize is a measure of the productiveness of the individual corn plant, the character

of the sire is unknown. In the case of the other cereals or of potatoes, the size of the kernel or tuber is no necessary measure of the productiveness of the parent. A small kernel from a fine well-bred individual is better than a large kernel from a poor indifferently bred individual. Other things equal, a small tuber from a large hill of potatoes is better than a large tuber from a small hill. In case the large and small seeds come from equally good heads of wheat, which will probably be the case under average conditions, the large seeds may perhaps give the best results, especially as under field conditions the larger size may be of advantage in enabling the plant to get a more vigorous start. Hays believes it to be established that the best heads of wheat as well as the best plants should be selected. To succeed in plant breeding, the seed must be selected from individuals which possess the characteristics it is desired to perpetuate, while the characteristics of the seed are of minor importance, provided the vitality has not been impaired.

Steps in the Improvement of Plants: There are three steps in the improvement of plants or animals, viz., (A) inducing variation; (B) selection of forms having desired characteristics; (C) testing the power of specific forms to reproduce themselves.

Variation: Variation is the basis of selection. Plants must vary or they could not be selected. There are two general methods of producing variations, viz., (1) environment, such as soil, climate, space, cultivation, etc.; (2) crossing.

The causes of variability cannot be discussed here but the following facts should guide the breeder of plants:

(1) Horticulturists do take advantage of a superabundance of food in causing modification or multiplication of parts, such as the development of petals from samens. After this habit becomes fixed it will be transmitted in some measure, even in poor soil.

(2) Nevertheless, the most important value of cultivation in the case of most plants is to allow the plant breeder or cultivator to study individual forms. It enables him to select the desirable forms and reject the undesirable ones. By milking the cow and testing her milk we are able to select the best milkers. By trotting horses we are enabled to breed those best able to trot. Whatever influence milking or trotting may have, the fact remains that it makes possible intelligent selection.

(3) The variations selected should be those induced under the environment in which we expect to continue to grow the crop. If we expect to grow three stalks of corn to the hill in general field culture it is desirable to select the ears for planting from corn grown in a similar manner rather than from ears where but one stalk is grown in a hill. In the latter case the size of the ear will not be a criterion of the size of the ear where three stalks are grown in a hill. Where it is not possible to make selection under field conditions, care should be taken to select from among plants under like environment and subsequently subject to field conditions.

"In selecting sugar beets," says Vilmorin, "those roots are sought for that are straight, long and free from lateral branches. This is right, for those that are branched are more difficult and hence more expensive to gather. Now, certain growers of beet seed in the north of France once formed the idea—thinking, no doubt, in this

way to improve their varieties—of growing the plants which were to be used as seed stocks in very rich, deeply worked soil where they were very much crowded together; so much so that 16 to 20, or even more, grew on one square meter of ground. The result was that the beet assumed the form and later the length of a whipstock. They were not branched because the roots were very closely crowded together. Their sugar content was abnormally high as a result of their growing so close together, and the conclusions drawn from the form of the roots and their sugar content, as determined in the laboratory, were tainted with error because they did not represent qualities truly acquired, but modifications accidentally imposed by external conditions. Thus these beets which were declared to be of good shape and composition in the laboratory, yielded seed which when sown in the open field, produced branched roots of only moderate sugar content, because the descendants had reassumed their true characters when they were released from the restraint which had been artificially imposed upon the parent plants."

Crossing: Crossing two unlike forms or two varieties may not be a fundamental cause of variation. Some other cause must have operated to produce the two unlike forms. In practice, however, crossing is a means of inducing variation, so as to enable the breeder to select form more nearly suited to his ideal. This is shown by Hays in the case of a hybrid between Fife and Blue Stem wheat. He found that some of the plants of hybrid wheat yielded more and some less than any of the plants of either the Fife or of the Blue Stem. If the yield is the characteristic desired, then a few plants of the hybrid were better than either of the present varieties.

Crossing is also employed not only to induce variation, but to combine two or more desirable qualities in one plant.

Selection: Plants having varied either through the efforts of the breeder or otherwise, the next step is to select plants having the characteristics desired. "Selection is the surest and most powerful instrument," Vilmorin declares, "that man possesses for the modification of living organisms."

The unit of selection is the individual. In the case of wheat the unit is not the seed, nor even the head of wheat, but it is the stool containing several heads and many seeds which have been produced from a single seed. In the case of the potato it is the single hill and not the single potato.

Only useful characters should be selected, because two characters are more difficult to develop than one; three more difficult than two, and so on. Some characters are mutually antagonistic, as extreme earliness and either great size, or productiveness. To select wisely requires deep study and good judgment. Varieties frequently deteriorate on account of unwise selection. This is especially true of maize, although it is the field crop which it is the easiest to select.

Testing Hereditary Forms of Plants: Having selected a desired form, it is next necessary to test its ability to transmit its characters. Even though the sire (plant furnishing the pollen) may be known, there is no certainty that the plant will transmit the characters which it possesses. Different kernels from the same head of wheat are known to yield unequally. Some variations are easily fixed; others require generations of selection before the characters

can be depended upon. Under ordinary farm conditions the ability of individuals to reproduce themselves is not tested, and furnishes a very important reason why little progress has been made in the improvement of field crops. Take timothy, for example. A casual inspection of a field of timothy will show that there is a great variation in the length of head, the length of stem, the amount of leaves and the number of stalks per stool. Under the usual method no selection is exercised and no test of the power of transmission of characters is possible. A few experimenters have selected plants (stools) having different characteristics and by planting 100 seeds from each plant in rows, one seed at a place, have obtained remarkable results. After the ability of the plant to transmit its characters has been demonstrated, the seed can be rapidly mutilated for field purposes.

It is well understood by live stock breeders that the best individual does not always produce the best progency. It is a common expression that this animal is a good breeder or that animal a poor breeder.

At the Ohio State University in 1902, fourteen ears of maize of a given variety were selected and two rows of fifty hills each were planted from each ear. The smaller ear containing next to the smallest weight of corn produced the heaviest yield of corn. This ear weighed 14 per cent. less than the average weight of the fourteen ears and yielded 32 per cent. more than the average yield of the same fourteen ears. This testing of the power of plants to transmit their characteristics is painstaking work and will form a large part of the work of the successful plant breeder.

The Importance of Large Numbers: If a thousand persons stand in a row it will be found that most of them are nearly the height of the average, while a few are considerably shorter and a few considerably taller than the average. The length or weight of a number of ears of maize will vary in the same manner. This chart shows the yield of 509 hills of Early Ohio potatoes grown this year at the Cornell Agricultural Experiment Station. Most of these it will be noticed varied uniformly and to a small extent from the average of all, while a few hills yield much more and a few less than the average. The average yield of the ten poorest hills was 44.4 grams, and of the ten best hills was 1035.4 grams, or on the basis of 80 per cent. of a stand 14 and 320 bushels respectively. No such difference in hereditary power can be expected, since part of the difference, how much we do not know, is due to environment. There will be a tendency on the part of the poorest and best when planted to return to the common or average type. What it is desired especially to emphasize is the fact that it seems to be a universal law of organic being for most of them to breed true to type while a few of them vary considerable from that type. In order, therefore, to make progress in breeding, it is necessary to find the organisms that have the tendency to vary as desired. Among a million organisms there may be only one that possesses the required characteristics. The chances of finding the desired individual increase as we increase the number from which selection is made, the chances of securing satisfactory results are increased many-fold if 5,000 seeds are planted instead of 500.

Plant Breeder's Advantages: It has been shown that the breeder

of animals has the advantage of the breeder of plants in that he can more easily control the mating of parents. The breeder of plants has a distinct advantage in being able to work with large numbers.

In the case of live stock, only the inferior females can be discarded, because in working with adults the expense of discarding the adults cannot be afforded. Indeed the number of sires that are to be found in the upper end of the curve is so small that the sires are apt to be but little if any better than the average. In the breeding of animals, in practice, it is the few inferior animals represented by the lower end of the curve that are discarded. In the case of plants, however, embryo plants (seeds) are produced in such abundance and at so small expense that only the few at the upper end of the curve, which are distinctly superior, need be saved. Instead of discarding the poorest ten per cent. as in the case of animals, only the best five, or even one per cent. may be saved in the case of plants.

Improvement of Indian Corn : A grain of corn, like the grain of wheat, is more than a seed. It is a fruit. It is a fruit in which the pod is thin and dry and remains closely adnate to the seed which is within.

The pod consists of three coats, within which are two coats, the so-called integument or testa. These five coats we may call the hull. Inside the hull is a layer of large cubical cells. This layer is called the aleurone layer. Inside is the endosperm. At the base of the grain and on the side next the tip of the ear is the embryo or germ. In cross section the two most conspicuous portions are the endosperm and germ. An examination of cross sections will show that the germ may vary largely in size and that the endosperm varies in appearance from snow-white to a translucent or icy appearance. The relative proportion of white and translucent endosperm varies greatly in soft, dent, flint and pop corn, while in sweet corn it has been completely transformed. Most of the fat of a grain of corn is to be found in the germ. It is obvious, therefore, that the grains containing large germs will contain a large percentage of oil.

Dr. Hopkins established that a row of kernels would chemically represent the ear. He also established the fact that any man with a pocket-knife could select corn for high oil or low oil content. He further established that having selected ears containing high oil and low oil content, they would transmit these characters. Beginning with the same variety of corn, ears were selected for four years for high and for low oil contents. Then ten rows of corn were planted with both kinds of corn, every hill having each kind of corn just far enough apart to identify the stalks. Thus they were grown in the same season, in the same soil and under the same cultivation. The corn selected for low oil contained 3.8 per cent. of oil; that for high oil, 5.8 per cent. of oil. In other instances variations in content of oil have been brought about ranging from 2.5 to 7.0 per cent.

Dr. Hopkins has shown that the per cent. of protein in the horny starch of an average ear of corn is 10.2 per cent. while in the white starch it was less than 8 per cent. He has also shown that more than 42 per cent. of all the protein of a kernel is in the horny starch. Consequently he proposed that by selecting ears containing large amounts of horny starch, any farmer with a jack-knife could breed corn for high protein content. By this method, corn has been bred

which contains but 6.7 per cent. of protein and as high as 14.4 per cent. of protein.

No results of influence upon yield have been reported. The most important effect of this work will be to call attention to the proper method of breeding corn, namely, to select the type of ear desired and then to test its ability to transmit its quality.

Corn may be bred for outward characteristics, for quality and for yield. The finest looking ear may not be the best yielding ear. Breeding for quality may be desirable under some circumstances, but is subject to the objection that if both quality and yield are sought for, you are breeding for two characters in place of one. The question may be properly raised whether any ear of corn that is well matured is not good enough in quality.

An objection to raising corn for high protein is that unless you decrease the yield, you increase the amount of nitrogen removed from the soil. It is a question whether it may not be better to raise the nitrogen needed in leguminous crops like clover and alfalfa, soy beans and cowpeas, and raise corn primarily as a source of easily digestible carbohydrates. A farmer is known who has deliberately announced his intention to breed corn for low protein content and get his nitrogen from those crops which are supposed to gather their nitrogen from the air.

Whatever the purpose for which corn is to be bred, a definite plan of procedure should be followed. The breeding plat method is the one now commonly adapted.

(1) First carefully consider the variety of corn best suited to your purpose. Having selected the variety, grow no other.

(2) Select 100 ears of perfect vitality of this variety. Weigh each ear separately and arrange in order of weight.

(3) From these 100 ears, select forty ears nearest your ideal, giving due importance to weight of ear, but not neglecting other qualities. If you have not had much experience in selecting corn, a score card will be found helpful in making selections.

(4) Next, shell each ear separately, weigh cobs, and determine total weight and per cent. of shelled corn. With this information, select twenty-five out of the forty ears and number ears 1 to 25.

(5) Lay off a piece of uniform land fifty hills square and plant rows 1 and 26 to ear 1, rows 2 and 27 to ear 2, until ear 25 is planted on rows 25 and 50. Place five kernels in each hill and when plants are three to four inches high, thin so that each row has 150 plants. If this plat of corn is planted by itself, four rows of corn should be planted clear around the plat from what is left of the twenty-five selected ears. Generally speaking, the most practical way will be to plant the plat in the body of a field containing the ordinary crop which will be of the same variety. The breeding plats should not be within twenty rods of neighbors' corn fields, especially if the variety is different.

(6) When the corn is properly matured, husk and weigh the ears from each row separately under exactly uniform conditions. If the progeny of a certain ear yields more and better corn from both rows than does either row from another ear, then you are justified in assuming that the former has superior hereditary force and that the improvement was not the result of environment.

(7) For the next year's breeding plat, select twenty-five ears from

the progeny of the best five years. Select the best of what is left for planting the field crop.

The advantages of this method over that of ordinary field selection lies in the fact that you test the hereditary or breeding power of the ears selected. Under field selection with promiscuous mixing of seed from different ears you have no knowledge of the ancestors of your progeny. On the other hand field selection has the advantage of giving you a larger number of plants from which to select. Great care, also, must be exercised with the breeding plat lest too close breeding results.

Before leaving this matter of corn improvement, I wish to emphasize the importance of a factor in corn production a little apart from that of breeding. Probably the most direct means of increasing the yield of corn open to every grower is the obtaining of a uniform and vigorous stand of plants. This is, seemingly, a very simple matter, yet the lack of it cost the farmers of the United States probably millions of dollars annually. Seed corn should not only germinate but it should germinate vigorously. If it can possibly be avoided, corn with less than 95 per cent. germination should never be used. Using additional seed to make up for loss of germination will not answer.

It is of the utmost importance that the stand should be uniform as well as uniformily vigorous. If a corn planter is used this means that the grains of corn should be of uniform size and shape. For this reason corn of uniform type should be employed. It is desirable to reject tip and butt grains to obtain uniformity of size and shape. It pays to select your corn with this point in view and to work with your corn planter on the barn floor until it will plant the desired number of grains at least 90 times out of 100.

The experimental evidence clearly shows that it is better to err by using too much seed than too little. This remark applies in fact to all cereals.

The Importance of Small Grains: There is only time for a word concerning methods of improving the small grains. Starting with a good variety something may be accomplished by carefully grading the seed and using only the larger ones. This should be done through the use of screens rather than by the use of wind, since it is the size of the seed rather than the specific gravity or relative density that is desired. This method of selection is only partially successful since large seeds do not necessarily come from large yielding plants or small seeds from low yielding plants, but it is of sufficient value to pay for the expense involved and is a step in the right direction even if the only value be to secure uniformity of stand and germination. The next step is to maintain a small seed patch from which seed for the main crop may be raised. Select the best stools, preferably the best heads from the best stools and plant this seed patch from seed thus obtained. Afterwards select the best of the seed patch for the next year's seed patch, using the remainder for the general crop.

A further step is the plant nursery, in which a number of seeds, say 50 or 100 from each selected plant, are planted separately, in order that the hereditary power of each separate individual may be observed and selections made from those which show the best re-

sults. The Cornell Agricultural Experiment Station has 12,000 timothy plants, each 30 inches apart, obtained from more than 200 different sources from different parts of the world. A certain plant out of these 12,000 produced 86 heads at the age of nine months. In this manner some of the Experiment Stations have sought by crossing, selecting and testing to improve wheat. Professor Hays of Minnesota, now Assistant Secretary of Agriculture, has produced a number of new varieties or strains, notably Minnesota No. 169, which he believes has made possible the increase in the yield of wheat in Minnesota one to two bushels, or 5 to 10 per cent. Saunders has produced in a similar manner a number of varieties of wheat and barley which have been useful to the farmers of Canada. Farmers should always be on the lookout for chance variations which they may select, propagate and thus possibly make useful. One of the most noted examples of this sort of selection is in the case of Fultz wheat, one of the best and most commonly grown varieties of wheat, which history tells us was a chance selection of some beardless heads selected from Lancaster, a red-bearded variety, in 1862, by Abraham Fultz, Mifflin county, of your own State.

Conclusion: In closing, allow me to repeat that the individual plant is the result of environment and heredity. To the farmer, a particular crop is the result of many factors, including season, soil, seed and strenuousness on his own part. He has not been too strenuous in the preparation of his soil, his eternal vigilance against fungus diseases and insect enemies has not been misplaced, he has not exercised any too much judgment in the rotation of his crops, he should be more careful in the selection of his seed than has been the custom. He can no longer afford to raise scrub-plants. If his own seed is inferior it will probably be a waste of time to try and improve it. Get a fresh start, preferably from a neighbor who produces superior crops. Unfortunately, an attractive advertisement of a wonderful new variety is not sufficient evidence of its value. Most wonderful improvement has been made in the past century in the improvement of vegetables, fruits and flowers which have added both to the health and happiness of mankind to an extent that only those who have studied the influence of the dietary of past ages fully comprehend. Comparatively little improvement has thus far been made in the staple field crops, particularly in the cereal crops. As I have tried to suggest, one reason for this is the lack heretofore of systematic effort upon right lines. The selection has not been from the best plants, except in the case of corn, and the hereditary power of the individual plants has in no case been tested. It must be remembered, however, that the cereals have all been cultivated for centuries. While the attempt to add one grain to an ear of corn or to a head of wheat or oats it is quite worth while, no revolutionary improprovement can be hoped for, and in all attempts there must be more failures than successes. For this reason the greater will be the honor and profit to those who do accomplish marked improvement. It will be years before the majority of farmers will adopt the methods which I have outlined as possible. Herein lies a suggestion for those of you who can see the same possibility in the breeding of cereals as in the breeding of domestic animals. If you succeed by even a little in raising better crops than

your neighbors, they will come to you for seed and thus they, you and the cause of agriculture will be benefited thereby.

In a dark corner of an alley in Paris there was a hook. On this hook fifteen people committed suicide in a fortnight. The hook was removed, and the suicides stopped. This is an illustration of the power of suggestion. If I have this afternoon been able to suggest a hook upon which the agriculture of the great Commonwealth of Pennsylvania can be, not destroyed, but uplifted, my purpose will have been accomplished.

Mr. Clark inquired if the kernels of corn on the tips and butts of the ear had been rejected in the selection of seed corn whether better results would follow.

PROF. HUNT: So far as hereditary power is concerned it don't make a particle of difference whether it is the tip kernel or the butt kernel. The experiment station at Cornell has tried this very experiment and it has been shown that it does not make any difference, they get the same result provided they have the same conditions. Now it is very possible that in some experiments where they planted tip kernels, the stand was not as good as where they planted butt kernels; if anything, the yield is just a little bit in favor of the tip and butt kernels in the experiments that have been made, instead of the others.

It pays to select your corn with this point in view and to work with your corn-planter on your barn floor until it will plant the same number of grains ninety-five times out of a hundred. That thing cannot be too much emphasized, either, when the importance of the corn crop is considered.

The CHAIR: This very excellent address brings us to the close of our program, and we are now ready to hear the report of our Legislative Committee.

Mr. Temple presented the report of the Legislative Committee as follows:

REPORT OF THE LEGISLATIVE COMMITTEE READ AT THE STATE BOARD OF AGRICULTURE AT ITS ANNUAL MEETING, JANUARY 24 AND 25, 1905.

Whereas, The Apairists of the State are threatened with destruction by contagious diseases, we recommend that such laws be enacted as will give the bee-keepers such protection as is accorded to other branches of agriculture.

We believe in the enlarging of the office of the Economic Zoologist, by such assistance as is necessary, to make it possible to accomplish the work required of the farmers of the Commonwealth.

We also endorse the application of the Economic Zoologist for a

liberal appropriation to enable him to use effective means to suppress San José Scale and other insect pests.

We also favor a change in the road law of 1903 as follows:

That the township and county be relieved of the levy of taxes in the construction of these roads, and that each county receives its share of the State appropriation according to the road mileage, and that the Highway Commissioner spend said amount in each county for the next two years on the building of the main-traveled roads of each county, with a view of ultimately having the inter-county main roads of the State improved. We believe the township road law of the State should be repealed and the act of 1897, so far as relates to the payment of road tax and the election of road supervisors.

We heartily endorse the resolution offered by Mr. McGowan, of Berks, pertaining to the Experiment Station and the completion of the Dairy Building at State College.

We recommend that legislation be enacted to permit the printing of such increased number of bulletins of the Economic Zoologist of the Department of Agriculture as may be necessary to meet the demands of our citizens.

We approve of Nature Studies being taught in our public schools, and also recommend the centralization of our rural schools so far as possible.

We are also unalerably opposed to the repeal of the Grout Bill.

We recommend that the present dog-law be so changed or amended, that it shall be the duty of the assessors to assess said dogs at a value placed upon them by the owners, that the taxes for said dogs be ten per centum of their value per annum, but in no case shall the taxes be less than one dollar per dog, that the taxes be collectable as other taxes are; that after the dog or dogs have been assessed, the constable of the district shall furnish to each owner of dogs a metal tag on which the number of the dog corresponding to that of the register of the assessed dogs made out by the assessor for which the constable shall receive a compensation of a sum not exceeding 25 cents per tag, and it shall be the duty of the constable to kill any and all dogs found in his bailiwick without such tags attached to its collar for which service he shall receive a compensation of fifty cents per dog killed, and said constable make these returns under oath to the court of quarter-sessions every three months at the regular term, damage to be assessed and paid as under the present law.

We recommend that the Legislature be requested to make a liberal appropriation for the purpose of improving the poultry industry of the State.

We heartily endorse the efficient work of the Department of Agriculture, including the Farmers' Institutes, Dairy and Food Division, Division of Economic Zoology and the State Veterinarian.

We also recommend that such law or laws be enacted as will allow the trolley companies of Pennsylvania to carry freight.

We recommend that the appropriation for the use of the Farmer's Institutes be increased.

We ask that the present Legislature appropriate a sum sufficient to cover the actual expenses of the members of the State Board of Agriculture when in attendance at their regular meetings.

The CHAIR: You have heard the report of your Committe. What disposition will you make of it?

It was moved and seconded that the report be adopted as read, which was agreed to.

MR. HUTCHISON: There is another matter that I wish to present to the Board in regard to a bill creating a State Fair. The members of the Committee are all in favor of a State Fair and will want help along that line; and in reading over the list of the organizations that recognize or are to participate in this fair, we find the State Board of Agriculture has been exempted, and the Committee thought it was not proper that we should endorse that without bringing it before the body. We deferred that endorsement, but we are ready to help these gentlemen, and do anything in our power. We would like to have an explanation from them why they left out this old and honorable body, and recognized the Carnegie Institute in Pittsburg, the Franklin Institute in Philadelphia and kindred other agricultural organizations. They also left out the Poultry Association, which may have been an oversight. We want to work hand in hand in this, but we want to have a little say, you know. We would like to hear from Brother Norton.

MR. NORTON: Mr. Cairman, I don't know that I am entitled to the floor. In explanation of this I would say we thought of this matter, and when we came to look up the law, we found that the Secretary of Agriculture and the Secretary of the State Board was one and the same person, and it apparently gave them two members of the Board of Directors. That was the reason this was done. Now it is not yet too late. This bill has not been presented, and we want to have the opinion of the State Board here. We want the help of all the organizations; we want the help of the State Board of Agriculture, and also of the allied organizations throughout the State.

In reference to the Carnegie Institute and Franklin Institute, we have got to have the help of manufacturers. Dr. Leonard Pearson, of Philadelphia, Mr. Bayard, of Pittsburg and myself drew the bill and we tried to get others to meet with us. We had a few but didn't have the number with us that we should have had. We want the co-operation of every one, not only one interest, but all interests. If we have made a mistake, we shall be glad to correct it. We thought of the Poultry Association, but I don't know why the Poultry Association should be recognized. The Pennsylvania Live Stock Association includes every breeder of stock in the State of Pennsylvania, from horses down to dogs, poultry and all classes are included. If you single out the Poultry Association, why not swine, and perhaps horse and cattle breeders. We considered the matter and concluded it could not be done, so we took but one man from the Breeders' Association; that includes everything, horses, cattle, swine, dogs and cats if they see fit to show them. We want to include the State Board of Agriculture and that was the only reason. When we came to look at the law we found that the Secretary of the State Board was also the Secretary of Agriculture and it gave them two members on the State Board, and we tried to cut the membership down to fifteen.

MR. HERR: I would like to ask a question. Has this bill been read before the Board of Agriculture?

HR. HUTCHISON: It has not.

MR. HERR: Then I move that it be read before we undertake to act upon it.

The CHAIR: If there are no objections, the bill will be read.

The bill was read by Secretary Critchfield.

The CHAIR: Now gentlemen, you have heard the reading of this bill; what is your will?

MR. CLARK: To bring this matter before us, I move that the State Board of Agriculture endorse this bill .

The motion was seconded.

The CHAIR: Are you ready for the question, gentlemen?

MR. HERR: I would like to amend, by including one member of the State Board of Agriculture, and let that be recognized the same as other departments are.

The amendment was seconded.

MR. NORTON: Mr. Chairman, I will accept the amendment and see that it is put in the bill.

The CHAIR: Very well then, with that amendment the motion is before you for the approval of the bill.

MR. McGOWAN: In the list of organizations, I see the name of the State Horticultural Society is not mentioned—the Pennsylvania State Horticultural Society. There are two organizations in this State and their names are so similar that there may be some misunderstanding unless it is distinctly stated as to which one is intended. There is in Philadelphia a society called the Pennsylvania Horticultural Society. I know it does not hold any meetings outside of the city of Philadelphia. The society that I believe is intended, is the State Horticultural Association of Pennsylvania.

MR. NORTON: That was the society that we meant to recognize, the State Horticultural Association, and I will see that it is changed so as to make it satisfactory.

MR. FENSTEMAKER: Mr. Chairman, I want to go on record as not being in favor of this bill. It looks to me to be one of those leaks, taking money where it might be used to better advantage. The idea of appropriating money to pay premiums as provided for in that bill does not meet with my approval. What are you going to do with the receipts from this exhibition? We have fairs in nearly every county. Why don't you devote this money to better public schools in the country districts? Then everybody would get some good from it, not only a favored few.

The CHAIR: All favoring the motion to endorse this bill will please vote aye. The motion seems to be carried; the motion is carried, and the bill is endorsed by the Board.

MR. CLARK: I wish to ask leave to offer a resolution at this time.

The resolution was read by Mr. Clark as follows:

Whereas, We recognize the importance of the fruit industry in the State and the great possibilities for its development;
Resolved, That we favor the establishment of a Division of Horticulture in the Department of Agriculture as provided by the State Horticultural Association.

The resolution was adopted.

MR. HUTCHISON: We have with us here a gentleman who is doing a great deal for the cause of agricultural education throughout the State, by publishing one of the best agricultural papers that is published under the sun, Mr. Harman, of Pittsburg, who delivered such a nice address at Bellefonte. I would like to hear him.

The CHAIR: I take pleasure in presenting to you Mr. Harman, of Pittsburg, connected with the National Stockman.

MR. HARMAN: Mr. Chairman, and Gentlemen of the State Board of Agriculture; I appreciate very much your kind invitation. I have really nothing of interest to say; it takes me about six months to write a fifteen minutes' speech and then it is not worth anything when I get through, but I would like to say something in regard to this State Fair bill. I am glad you adopted that resolution with almost a unanimous vote. Possibly those who voted against it have a good fair at home and didn't want to hurt it. I don't know anything about that; that is sometimes the case. I am a Pennsylvanian you know, by choice. Most of you are Pennsylvanians because you couldn't help yourselves; you were born in the State. I came from Ohio; that is not very far west, not near as far west as our distinguished friend Lovejoy. He's from Illinois. We have other Western men here, but to me the State Fair business is an extremely interesting body. In my business I am compelled to travel all over the United States nearly, during the State Fair season, and have visited all the State fairs from St. Louis east. I think I have seen them all, and it really makes me heart-sick when I strike a man in Ohio, Illinois or Indiana who asks me how their fair compares with the State Fair of Pennsylvania.

I very seldom tell a lie, but on occasions of that kind, I must confess I lie a little bit—just a little bit. I want to say right here, and I don't want to take a minute of your time longer than necessary, but I want to say to every member here of the State Board of Agriculture and to every man who has any influence whatever, that you can't do anything better than to work for this State Fair bill, and get it through and make a success of it.

If every farmer in Pennsylvania could have the pleasure of visiting the State Fairs in Ohio, Illinois and Indiana, there would be no question about the support of a bill of this kind. You want

to go out and see what others are doing. We must have this law. If we don't get it this time, we will get it the next time. It is the ambition of everybody that has any interest at all in the live stock or agricultural interests in Pennsylvania, to have a State Fair and one that we can be proud of, and we can have it. The great trouble with the agricultural interest in Pennsylvania—the great troubles are that we have a great city in the eastern part of our State, that has a larger population than some of the Western states, and we have a city in the western part of the State that has nearly as many; those two interests never consider agriculture in any way whatever.

I was in Washington City a year or two ago and called to see Secretary Wilson on some matters in regard to agricultural matters that I considered right important, and the first dash out of the box was "What do you mean, to come here and talk about these matters in Pennsylvania? You have no agricultural interests in your State." He didn't mean just what he said, but it implied an impression on his mind, and on the minds of everybody else. People from outside hear of your iron industries, your coal industries, your manufactures, and everything on God's green earth except your agriculture and your live stock. They think you have no live stock in Pennsylvania and no agricultural interest in Pennsylvania. Statistics are not looked up and they do not realize the facts of existing conditions because we have nothing to represent our live stock interests, or our agricultural interests in the way of an annual show, such as these other states have that bring the topics to the minds of the people outside of the State.

I promised you that I wouldn't annoy you with a long talk. I am glad to have the opportunity to say what I have said, and I do hope you will think as I do and earnestly work for the State Fair.

MR. HUTCHISON: We have with us a farmer that farms quite extensively throughout the State, in the person of Dr. Schaeffer. He is an ex-officio member of the Board. I am sure we should all be glad to hear from him.

The CHAIR: We would all be very glad to hear from Dr. Schaeffer.

DR. SCHAEFFER: Fellow farmers: I own a little farm down in Berks county, although somebody else has to do the work on it, and because of my ownership of that farm, by friend Hutchison seems to have a notion that I know something about farming, probably because I once showed him how to plant a tree up here on Capitol Hill. I don't wish to take up any time in making a speech because a very important organization is to meet right after this Board adjourns; that is an allied agricultural organization for the promotion of agriculture in other ways, and as I am anxious to have that body meet, it would be very much out of place for me to make a speech here. I hope after you have finished your business and adjourned, those of you who are interested will come to the front and attend the meeting of that organization which I deem of very great importance.

MR. NORTON: fmmediately after the adjournment of this body, we are to have a meeting of the Pennsylvania Live Stock Breeders' Association, and also to-morrow, and we will be glad to have all of you stay and attend these meetings.

MR. CLARK: Mr. Chairman, I move you that we do now adjourn.

The motion being seconded, it was agreed to, and the meeting thereupon adjourned.

N. B. CRITCHFIELD,
Secretary.

COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 134.

PROCEEDINGS

OF THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

Pennsylvania State Board of Agriculture,

HELD IN THE

BOARD OF TRADE ROOMS, HARRISBURG, PA.

JANUARY 24 and 25, 1905.

WM. STANLEY RAY,
STATE PRINTER OF PENNSYLVANIA.
1905.